

ELSE RESEARCH REPORT

**CONCENTRATION, AUDITOR
SWITCHING AND FEES IN THE UK
AUDIT MARKET**

Prepared for BDO Stoy Hayward LLP

Report from LSE Enterprise

By Thomas Kittsteiner and Mariano Selvaggi

February 2008

EXECUTIVE SUMMARY

The objective of this report is to study whether high concentration among big auditors leads to higher audit fees being paid by large corporate clients, and to assess whether there is an audit fee discount after a company changes its auditor. This study provides an independent assessment of some of the costs associated with high concentration in the market for auditing services and little auditor rotation among large companies.

We look at large UK-listed and private companies over the period 1998 to 2006. The dataset FAME provides us with information on the company's auditor and annual audit fees. This is then set against annual financial accounting data at the company level also retrieved from FAME.

Among the main conclusions are the following:

- During the time period 2002 to 2006, namely after the collapse of Arthur Andersen, increases in the joint market share held by the largest four auditors are strongly correlated with higher audit fees paid by UK-listed corporate clients;
- A decrease of 10 percentage points in the market share currently held by the Big-4 auditors could lead to a drop of about 7% in the annual audit fees paid by UK companies;
- During the period 1998 to 2001, namely before the collapse of Arthur Andersen, we find no strong link between the joint market share held by the biggest auditors and annual audit fees. Increased concentration among the Big-5 does not seem to have necessarily resulted in higher audit fees;
- There is strong evidence that a change of auditor is associated with a fee reduction of 5% to 7%, although this fee discount does not persist over time. After three to four years of switching auditor, the audit fees paid by a UK-listed company is not significantly different from the fees paid by similar companies that did not switch auditor in the last four years;
- We confirm the fee premium being charged by Big-N auditors, other things being equal, which has consistently been found in previous studies.

We control for a range of other factors that might also affect the audit fee paid by a company. Our empirical analysis also considers alternative specifications and time periods to account for possible causal links not fully captured by our main models. We found the key conclusions are in general aligned.

CONTENTS

1.0	Introduction and scope of the study	5
1.1	Background	6
1.2	Structure of this report	7
2.0	Previous studies on the relationship between market concentration and audit fees	8
2.1	Studies on the impact of auditor switching on audit fees	8
2.2	Other determinants of audit fees	9
3.0	Empirical approach	11
3.1	Methodology	11
4.0	Market concentration and audit fees	16
4.1	Definition of markets	16
4.2	Concentration measures	18
4.3	Descriptive analysis	20
4.4	Econometric analysis and main results	22
4.5	Magnitude of the effects	24
4.6	The Big-N premium	26
5.0	Switching to a new auditor and audit fees	27
5.1	Switching in our dataset	27
5.2	Our switching variables	28
5.3	Main results	29
6.0	Concluding remarks	32
	REFERENCES	33
A1	Industry sectors	34
A1.1	List of markets used in the regressions for Model A	34
A1.2	List of markets used in the regressions for Model B	34
A2	Analysis of market concentration	36
A2.1	Model A (52 market segments) for all companies	36
A2.2	Model A (52 market segments) for listed companies	39
A2.3	Model B (21 markets) for all companies	42
A2.4	Model B (21 markets) for listed companies	45
A2.5	Robustness checks	48
A3	Analysis of switching	52
A3.1	Econometric outputs	52
	LIST OF TABLES	
Table 1	Annual audit fees, £000	12
Table 2	Descriptive statistics (all companies)	15

Table 3	Descriptive statistics (listed companies)	15
Table 4	Descriptive statistics	21
Table 5	Market concentration and audit fees	22
Table 6	Hypothetical impact of de-concentration on audit fees	25
Table 7	Fee discount as a result of auditor switch, 1998-2006	30
Table 8	Fee discounts after switching for listed companies	31
Table 9	Impact of concentration on audit fees, 1998-2006	36
Table 10	Impact of concentration on audit fees, 2002-2006	37
Table 11	Impact of concentration on audit fees, 1998-2001	38
Table 12	Impact of concentration on audit fees, 1998-2006	39
Table 13	Impact of concentration on audit fees, 2002-2006	40
Table 14	Impact of concentration on audit fees, 1998-2001	41
Table 15	Impact of concentration on audit fees, 1998-2006	42
Table 16	Impact of concentration on audit fees, 2002-2006	43
Table 17	Impact of concentration on audit fees, 1998-2001	44
Table 18	Impact of concentration on audit fees, 1998-2006	45
Table 19	Impact of concentration on audit fees, 2002-2006	46
Table 20	Impact of concentration on audit fees, 1998-2001	47
Table 21	Model A for listed companies with auditor's market share, 2002-2006	48
Table 22	Model B for listed companies with auditor's market share, 2002-2006	49
Table 23	Model A for listed companies with control for client's merger, 2002-2006	50
Table 24	Model B for listed companies with control for client's merger, 2002-2006	51
Table 25	Impact of auditor switch on audit fees, 1998-2006	52
Table 26	Impact of auditor switch on audit fees (listed companies only)	53
Table 27	Evolution of audit fee discount (listed companies only)	54
Table 28	Impact of auditor's tenure on audit fees (companies that switched auditor at least once during the period)	55

LIST OF FIGURES

Figure 1	Average audit fees (£000) and percentage of listed companies, 1998-2006	13
Figure 2	Market concentration based on Model A and all auditors, 1998-2006	19
Figure 3	Market concentration based on Model A and auditors of listed companies only, 1998-2006	19
Figure 4	Evolution of auditor switches (%), 1999-2006	28

1.0 INTRODUCTION AND SCOPE OF THE STUDY

In this report we seek to answer two related questions: does concentration among big auditors lead to higher audit fees being paid by large corporate clients, and does a switch of auditor result in lower audit fees? The answer to these questions may have important implications for the future evolution of the UK auditing market. We are also interested in analysing two connected issues, namely whether the relationship between concentration and audit fees differs for the period before and after the collapse of Arthur Andersen in the UK, and whether any fee discount granted to clients after a change of auditor diminishes as the auditor's tenure increases.

To try to answer these questions, we have looked at large UK-listed and private companies over the time period 1998 to 2006. We use the dataset FAME to obtain historical information on the company's auditor and the audit and fees charged in each year. This is then set against annual financial accounting data at the company level also retrieved from FAME.

Among the main conclusions of our analysis are the following:

- During the period 2002 to 2006, namely after the collapse of Arthur Andersen, increased concentration among auditors, particularly among the largest four auditors, is strongly correlated with higher audit fees paid by large UK-listed companies;
- During this same period, a hypothetical decrease of 10 percentage points in the joint market share held by the Big-4 auditors would have led to a decrease of about 7% in the annual audit fees paid by large UK-listed companies;
- During the period 1998 to 2001, namely before the collapse of Arthur Andersen, there is no strong link between concentration among auditors and audit fees;
- During the period 1998 to 2006, there is a strong and negative correlation between switching auditor and annual audit fees paid by listed companies: in its first year with a new auditor, the audit fees paid by a switcher are found to be 5% to 7% lower than the fees paid by a similar company that did not change auditor in recent years;
- The audit fee discount associated with a change of auditor does not persist over time: the magnitude of the discount decreases in the years following the switch. Three to four years after switching auditor there is no evidence that the annual audit fee paid by a listed company is significantly different from what similar companies that did not switch auditor in any of the previous years paid in that year.

To ensure the robustness of these findings, we controlled for a range of other factors that might also affect the audit fees paid by a company. Our empirical analysis also considers

alternative specifications and time periods to account for any possible causal links not entirely captured by our main models. We found the key conclusions are in general aligned.

1.1 Background

Competition in the UK audit market is lacklustre; the market is dominated by four big audit firms (Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers) that together share almost the entire market. This is especially true for the segment of the largest UK-listed companies. In addition, entry into the allegedly profitable top-tier section of the audit market still proves very difficult.

Research carried out by LSE Enterprise in September 2006 ("Phase 1") identified possible reasons for weak competition in the UK audit market, and explained why entry of mid-tier firms into the Big-N pool very rarely happens.

Other recent studies on the UK audit market report that concentration among auditing firms has increased over the past decade (see Section 2), and so have audit fees. It has been argued that as a result of higher market concentration, competition and auditor choice have decreased thus leading to higher audit fees for listed companies (see Oxera, 2006, Feldman, 2006). This argumentation is based on the so-called Structure-Conduct-Performance (SCP) paradigm, which states that market structure (and in particular market concentration) affects pricing behaviour of the competing market players. This in turn impinges on their profitability. According to this argument, the increased concentration in the auditing market and the ongoing predominance of fewer auditing firms can be seen as a reduction in auditor choice/competition and a subsequent rise in audit fees.

To be able to construct this line of arguments, though, one first has to establish that a positive link between concentration among auditors and audit fees actually exists. It is the aim of this study to try to establish that link. Specifically, we estimate empirically the effect of high market concentration and associated market dominance by few auditors in the UK audit market. This is done in terms of higher audit fees paid for auditing services and in terms of revenues foregone by large UK companies in general and UK-listed companies in particular.

We use data on the largest UK companies (listed and private) for the period from 1998 to 2006. We empirically tested whether the aforementioned relationships exist, and, if the answer is affirmative, we then proceed to assess its direction and magnitude. It is beyond the scope of this study to confirm that the SCP paradigm applies. We just focus on finding and, if possible, quantifying the relationship between concentration and audit fees in the UK auditing market. Similarly, we do not attempt to quantify the impact of increased concentration on the competitiveness and/or profitability for the auditors or their clients.

We also analysed whether audit fees decrease after a change of auditor. In addition, we analysed whether a discount associated with switching to a new auditor is reduced in subsequent years. As laid out in Oxera (2006), auditor-client relationships can be very stable for several reasons. Probably the most important one is that switching to a new auditor or auditing a new client creates cost that are absent in ongoing relationships. A price discount offered to a new client could therefore be a necessity for an auditor to grow its own business. Once a new client has switched to a new auditor, the latter can then profit from the fact that it is costly for the client to switch auditor again and increase fees back to a normal level in subsequent years. It is not within the scope of this research to identify the reasons and consequences of such a low-balling effect, should it exist.

1.2 Structure of this report

This report is structured as follows. Section 2 provides an overview of related studies and their findings. Section 3 describes the underlying dataset and explains our methodological approach. Sections 4 and 5 then represent the core of this report. The former describes our main findings concerning the relationship between concentration in the UK auditing market and annual audit fees, whereas the latter reports the results of our analysis of switching behaviour and audit fees. Finally, Section 6 concludes this report. The appendices provide additional technical details.

2.0 PREVIOUS STUDIES ON THE RELATIONSHIP BETWEEN MARKET CONCENTRATION AND AUDIT FEES

According to a study by independent consultancy Oxera (2006), the degree of market concentration in the audit industry increased after the Price Waterhouse/Coopers & Lybrand merger (1998) and after the demise of Arthur Andersen (2002). The Big-4 audit firms – Deloitte & Touche, Ernst & Young, KPMG and PricewaterhouseCoopers (PwC) – audit all but one of the FTSE 100 companies, and represent 99% of audit fees in the FTSE 350 (Oxera, 2006). Their regression analysis, on data from more than 700 UK-listed companies covering the period 1995-2004, found an increase in audit fees in recent years, with indications that concentration in the market partly led to this increase (Oxera, 2006).

The relationship between changes in market concentration and changes in audit fees was also studied by Feldman (2006) using a regression model on a dataset of 1071 listed US companies in 2000-2002. Feldman concluded that Andersen's collapse caused further market concentration in favour of the Big-4 and thus contributed to market-power-induced upward adjustment of audit fees (Feldman, 2006).

McMeeking et al (2005) examined 7255 UK firm's years between 1985-2002 for the effect of audit firm mergers on market concentration, competitiveness and audit pricing in the UK. From a non-parametric analysis of *N*-firm concentration ratio (CN), four-firm concentration ratio (C4) and the Herfindahl Index (HI), they conclude that mergers contributed to increases in the concentration of the UK audit market between 1985 and 2002.

Beattie et al (2003) assessed auditor concentration in the UK-listed company market for the period from 1968 to 2003 using non-parametric methods and concentration ratios (C4 and C8) based on audit fees and the number of audits. The Big-4 firms in 2003 held 96% of the market (based on audit fees), with PricewaterhouseCoopers alone having 37%, whilst the market shares of non-Big-4 players were significantly smaller (Beattie et al, 2003).

In 2002, the additional industry concentration brought on by the demise of Andersen and SOX prompted greater attention to risk resulting in a risk premium (Asthana et al, 2004). Asthana et al (2004) used cross sectional data regression of audit fees and found that the premium charged by Big-4 seemed to have increased. The effect of the Enron-Andersen affair was also examined by investigating the sample before the event (2000, 2001) and after the event (2002, 2003) using regression of natural logarithm of audit fees and on average, fees were found to be higher after this new instance of market concentration (Chi, 2004).

2.1 Studies on the impact of auditor switching on audit fees

Simon and Francis (1988) investigated the effect of auditor change on audit fees using 214 US firms that changed auditors during the period 1979-1984, with control firms being

226 firms that did not change auditors during this period. The results of their cross-sectional regression model suggested that auditor change led to price cutting or discounting in the initial year, continued over the next two years but in subsequent years the fee had risen to the same as for firms that did not change auditors (Simon and Francis, 1988).

Asthana et al (2004) found that auditor switching lead to lower fees for former Andersen clients (low-balling effect¹). This finding is reinforced by the study by Chi (2004) who concluded that the necessitated switching of auditors for former Andersen clients led to a decrease in audit fees for them whereas this fee-cutting was not observed for other companies.

McMeeking et al (2005) found from their regression analysis that fee discounting offered by UK audit firms to attract new business reduced from significant levels in 1986-87 to insignificant in subsequent years; however, there was an average fee discount following a change in auditor over 1986-2002 (McMeeking et al, 2005). In Pong and Whittington (1994), data from 1981 to 1988 are fitted using a standard OLS regression model with audit fees as the dependent variable and the authors also found that a Big-8 auditor charged more than any other firm and perhaps charged relatively more to profitable auditees than did smaller audit firms and that low-balling existed (Pong and Whittington, 1994).

2.2 Other determinants of audit fees

The three most important determinants of audit fees identified in the literature are auditee size, audit complexity and audit risk. Auditee size is measured by one or more proxies such as total assets, turnover or sales. The positive and significant correlation of audit fees with proxies of auditee size reflects that audit fees go up with the amount of effort required in audit processes (Oxera, 2006; Feldman, 2006; McMeeking et al, 2005; Asthana et al, 2004; Chi, 2004; Seetharaman et al, 2002; Lee, 1996; Pong and Whittington, 1994; Simon and Francis, 1988).

Complexity was also found to be positively correlated with audit fees indicating that greater complexity of clients' operations lead to higher fees for them (Oxera, 2006; McMeeking, 2005; Fields et al, 2004; Seetharaman et al, 2002; Lee, 1996; Pong and Whittington, 1994; Simon and Francis, 1988).

Some of the proxies for risk used were long term debts to assets and indicators for loss (net income less than zero, operating loss) and these correlated positively with the audit fees charged (McMeeking et al, 2005; Asthana et al, 2004; Fields et al, 2004; Seetharaman et al, 2002). A positive correlation between risk and audit fee could be indicative of risk shifting from auditees to audit firms, with the top tier firms providing greater insurance and thereby, charging a higher risk premium.

¹ Low-balling effect: a change of auditor tends to lower audit fees.

Among other controls, auditor market share, and whether the auditor is a large firm (Big Eight/Six/Five/Four) turned out to have statistically significant and positive correlation with concentration and audit fees (Oxera 2006; Lee, 1996; Pong and Whittington, 1994; Simon and Francis, 1988).

3.0 EMPIRICAL APPROACH

This section describes key features of the methodology and financial data underlying our empirical approach. The analysis falls into the branch of academic literature that investigates how the degree of concentration among auditing firms within a single country impinges on the level of annual audit fees paid by large corporate clients.

3.1 Methodology

3.1.1 Multivariate econometric analysis

The methodological approach used to uncover the impact of the extent of competition among auditors and auditor switching behaviour on annual audit fees is based on multivariate econometric analysis. This is a well-established technique that enables us to examine the relationship (correlation) between a number of main factors all of which are dynamic. In particular we can decouple the effect of our variables of interest from other economic and financial factors that may also impinge on the audit fees paid by large corporate clients.

Our point estimates are based on fixed-effects panel data regressions, where the unit of observation is each studied company. Each company is then tracked over several time periods depending on the amount of time it is active in our dataset. This is the most appropriate econometric model to exploit the cross-sectional and time-series features of our underlying data.

The variable we want to explain (dependent variable) is annual audit fees at the company level, while the key explanatory variables (independent variables) are several measures of market concentration in the provision of auditing services and indicators reflecting a company's pattern on auditor switching. The dependent and independent variables are explained in more detail below.

3.1.2 Data

The company-level accounting and financial information we used throughout the report has been obtained from FAME. This dataset includes basic information from the annual reports of UK listed and private companies. Of particular importance for us is the fact that FAME identifies the company's auditor during the last ten years. This information has been essential for our analysis of both concentration and switching behaviour.

We had to make a decision regarding the companies we wanted to focus on. Because of the intended scope and purpose of this study, we decided to look at publicly listed and private companies with an annual turnover of at least £1million in the fiscal year-ends between 1997 and 2006. This represented ten years' worth of financial accounting data. We also concentrated on companies that paid annual audit fees greater than £20,000 in

each of those years, in order to consider those corporate clients that are relatively important from a UK auditors' viewpoint.

However we decided to drop all observations for the year 1997 because the coverage by FAME of companies for that year turned out to be limited. After also dropping all observations for which FAME does not report the name of the auditor or the annual audit fees paid by the company, we were left with our final dataset of 8,816 company-year observations including information on 1,279 large UK-listed and private companies for the time period 1998 to 2006. Of these 1,279 companies, 825 (65%) are publicly listed and 454 (35%) are private.

The complete dataset with 8,816 records is free of survivor bias as it encompasses all companies that fulfilled our searching criteria during the nine-year period, including those that entered the dataset after 1998 and others that dropped out before 2006. This important feature of the assembled data improves the robustness of our conclusions.

3.1.3 Main variables

Consistent with previous research, our econometric regressions use as dependent variable the (natural logarithm of) annual audit fees paid by the companies. Table 1 reports some main descriptive statistics for the reported annual audit fees in our dataset, and Figure 1 shows the average audit fee and the fraction of listed companies by calendar year.

Table 1 Annual audit fees, £000

	Number of observations	Mean	Standard deviation	Minimum value	Maximum value
All companies	8,816	505.33	1,339.81	21	40,774.00
Listed companies	5,764	534.48	1,544.20	21	40,774.00

Source: FAME.

Figure 1 Average audit fees (£000) and percentage of listed companies, 1998-2006



Source: FAME.

Figure 1 indicates a persistent increase in the average audit fee paid by large companies during the studied period. This increase is not purely determined by the concomitant rise in the fraction of listed companies covered by our dataset, as the average audit fees paid by listed companies exhibit a very similar pattern over time. These are nominal audit fees so the observed increase over time may well be partly explained by the underlying inflation over the period.

Explanatory variables

The explanatory variables considered in our regressions in turn depend on the particular problem we look at. Specifically, when we study the relationship between the degree of concentration among auditors and the level of audit fees paid by large corporate clients we consider the following key explanatory variables:

- A measure of concentration among auditors in the relevant market (see Section Y);
- Whether or not the auditor is a Big-N auditor; and
- Whether or not the company switched auditor in the current year.

When we examine the relationship between auditor switching behaviour and audit fees paid by large corporate clients, we consider the following key explanatory variables:

- Whether or not the company switched auditor in the current year;
- Whether or not the company switched auditor in any of the last 4 years;
- The length of the new auditor's tenure after a company switches auditor;
- Concentration among the biggest auditors in the relevant market; and
- Whether or not the auditor is a Big-N auditor.

For ease of exposition, the main descriptive statistics of these two sets of key explanatory variables are reported in Sections 4.3 and 5.1, respectively.

3.1.4 Additional (control) variables

There are some other variables that have consistently been found to account for some of the observed variation in annual audit fees, both across companies and over time. These broadly include size of the company being audited, complexity and risk of the audit.

To control for these other determinants of audit fees, and to be consistent with previous accounting and economics literature, our final regressions include the following control variables for each company-year observation:²

- Total Assets – (in natural logarithm), to control for size of the client;
- Total Assets squared, to control for size of the client;
- Turnover – (in natural logarithm), to control for size of the client;
- Whether the company made losses in the current or previous year, to control for risk of the client;
- Current – (Current Assets divided by Current Liabilities), to control for risk of the client;
- Complexity II – (Trade Debtors divided by Operating Profits), to control for complexity of the audit;³
- Tangibility ratio – (Fixed Assets divided by Total Assets), to control for complexity of the audit;
- Short-term leverage – (Short-term Debt divided by Total Assets), to control for risk of the audit;
- Dummy variables for years, to control for year effects such as price inflation, key changes in legislation, etc.

Tables 2 and 3 show the main descriptive statistics of the above variables (in the same order as listed above) for the total sample of companies and for listed companies only, respectively.⁴

² We have also constructed and tested additional control variables in our regressions (such as different debt ratios, complexity measures etc), but the ones detailed here are those considered most relevant for our analysis.

³ For robustness checks we also constructed a complexity control labelled Complexity I, which is defined as Stock & Work in Progress plus Trade Debtors divided by Turnover. We did not include it in the main regressions as the number of observations for complexity II is larger. Results do not depend on this selection.

⁴ The annual values of the company's assets, turnover and fees are reported in 1,000 GBP.

Table 2 Descriptive statistics (all companies)

Variable	Number of observations	Mean	Standard deviation	Minimum value	Maximum value
Inassets	8,816	12.74	2.06	5.06	19.56
Inassets squared	8,816	166.49	53.28	25.57	382.76
Inturnover	8,465	12.63	1.99	6.91	19.00
dloss	8,811	0.33	0.47	0.00	1.00
Current	8,810	679.46	27,709.71	0.09	2,069,450.00
Complex2	8,014	726.95	34,109.08	-197,333.90	2,956,333.00
tangratio	8,771	47.18	26.67	0.00	100.00
shtlever	8,018	13.16	20.72	0.00	575.00

Source: FAME.

Table 3 Descriptive statistics (listed companies)

Variable	Number of observations	Mean	Standard deviation	Minimum value	Maximum value
Inasstes	5,764	12.09	2.05	5.06	19.49
Inassets squared	5,764	150.26	52.20	25.57	380.04
Inturnover	5,581	11.89	1.95	6.92	19.00
dloss	5,761	0.31	0.46	0.00	1.00
Current	5,764	191.74	289.84	2.69	8,118.06
Complex2	5,349	970.59	41,272.03	-79,389.48	2,956,333.00
tangratio	5,758	49.08	25.36	0.00	99.31
shtlever	5,067	7.40	11.59	0.00	266.05

Source: FAME.

Due to the used methodology, we do not need to control for any specific information of the client that remains relatively stable or does not change at all over the time period, such as number of foreign subsidiaries (as reported in FAME). For listed companies we also had information about their market capitalisation, but this information was fragmentary so we decided not to include it in our econometric regressions.

4.0 MARKET CONCENTRATION AND AUDIT FEES

In recent studies (Oxera, 2006, Feldman, 2006) it has been suggested that higher concentration in the market for auditing services, especially after the collapse of Arthur Andersen, has led to increases in the level of audit fees paid by large companies in the UK. In particular it has been argued (Oxera, 2006) that many very large listed companies (such as those listed in the FTSE350 index) only consider one of the Big-4 auditors (Deloitte, Ernst & Young, KPMG, and PwC), which results in a highly concentrated market for auditing services. It has also been conjectured that the resulting lack of competition/choice leads to higher audit fees as compared to a less concentrated market (e.g. Feldman, 2006, shows that in the U.S. the dissolution of Arthur Andersen triggered an increase in market concentration which in turn resulted in higher audit fees).

This section analyses the impact of market concentration among auditors on audit fees paid by large corporate clients for a variety of time periods, market segmentations and metrics of concentration.

In summary, our main findings suggest that:

- In most relevant cases, concentration among big auditors and audit fees are strongly and positively correlated during the period 2002 to 2006. This is the period of time after the dissolution of Arthur Andersen.
- There is no evidence that high concentration among big auditors led to higher audit fees during the period 1998 to 2001. This is the time period before the dissolution of Arthur Andersen.
- For the whole period 1998 to 2006, concentration among big auditors and audit fees are positively correlated for listed companies and negatively correlated for private companies.

This section is structured as follows. Section 4.1 explains our approach to the definition of audit segments, Section 4.2 discusses the concentration measures used, Section 4.3 then contains some descriptive statistics of the variables, whereas Section 4.4 contains the main results. Section 4.5 uses our point estimates to try to quantify some of the impacts of higher concentration among auditors on the annual audit fees paid by large corporate clients. Finally, Section 4.6 establishes and quantifies the Big-N premium.

4.1 Definition of markets

To measure the level of concentration among auditors in a given market it is necessary to first define the precise boundaries of that market. Ideally, all the companies that require a similar auditing expertise (and thus are close substitutes from the auditor's viewpoint) should be subsumed in a single market, while all the companies with sufficiently different auditing requirements should be considered as being in different markets.

As it is not feasible for us to identify the precise auditing needs for each individual company in our dataset, we define the boundaries of markets (used as the basis for our concentration measures) based on the following:

- Market definitions that have been used previously in similar studies; and
- Market definitions that take into account the views expressed by auditing firms and their corporate clients on issues connected to auditing requirements and market segmentations (as reported in Oxera, 2006, p. 57-58).

Market definitions are based on industry sectors (i.e., SIC codes) to account for the fact that many sectors have similar auditing requirements (see Oxera, 2006, p. 57).⁵ We consider two different models:

- **MODEL A** - Industry sectors are grouped in 52 markets;
- **MODEL B** - Industry sectors are grouped in 21 markets.

Discussion on market definitions

Market definitions based exclusively on industrial sectors is consistent with previous academic studies and also incorporates views expressed by auditing firms and their clients on which sectors are similar in terms of auditing needs. For example the coarser market definition (Model B), where each company is allocated to one of 21 different markets, is similar to that used by Oxera (2006). The use of different definitions in Model A and Model B is used to verify robustness of our findings with respect to variations concerning details of the segmentation.⁶

In our view an audit market definition based on industry sector is the most relevant one given the information available.⁷ Mid-tier auditors believe that in principle they could audit large listed companies, thus suggesting that market capitalisation per se should not be considered a decisive factor to define markets (see Oxera, 2006, p. 59-60).⁸ Further, market definitions based on size of the client (as well as sectors) give rise to many markets and very little variability in the resulting concentration metric, which makes it difficult if not impossible to assess the impact of changes in concentration among auditors on audit fees.⁹

⁵ Market definitions based on sector alone were also used in the study Feldman (2006).

⁶ It is beyond the scope of this study to identify in detail whether and to what extent certain industries differ with respect to their auditing needs.

⁷ One limitation of this approach is that it defines market boundaries in a strict way, meaning that competition for clients in one market is assumed to be independent from competition in other markets.

⁸ The fact that large listed companies are somehow reluctant to consider mid-tier auditors for their audits does not necessarily imply that they represent a stand-alone market. Notable exceptions are probably the banking and insurance sectors, so we have checked robustness of our findings by rerunning the analysis while excluding these sectors (the results of these reruns do not alter our general conclusions and are not reported).

⁹ Nevertheless, we repeated the analysis for market definitions also based on client's size, and can confirm that it is indeed more difficult to obtain statistically significant relationships.

Depending on the scope of the respective analysis (all companies or only listed companies), we consider each of the 52 or respectively 21 markets as consisting of both private and listed companies, or only listed companies.

4.2 Concentration measures

Economists have developed a variety of measures to quantify concentration in markets. Most of them are based on the number of companies operating in the market and their respective market shares. Our empirical analysis thus uses three widely used measures of market concentration:

- C4, which is the joint market share of the four biggest auditors in that market;
- C5, which is the joint market share of the five biggest auditors in that market; and
- Herfindahl Index (HI), calculated as the sum of the squares of the individual market shares of the auditors operating in that market.

We compute the above measures of concentration for each auditing market we construct in our dataset and for each year. Auditors' individual market shares are, in turn, calculated from the total audit fees reaped by that auditor in the specified year.

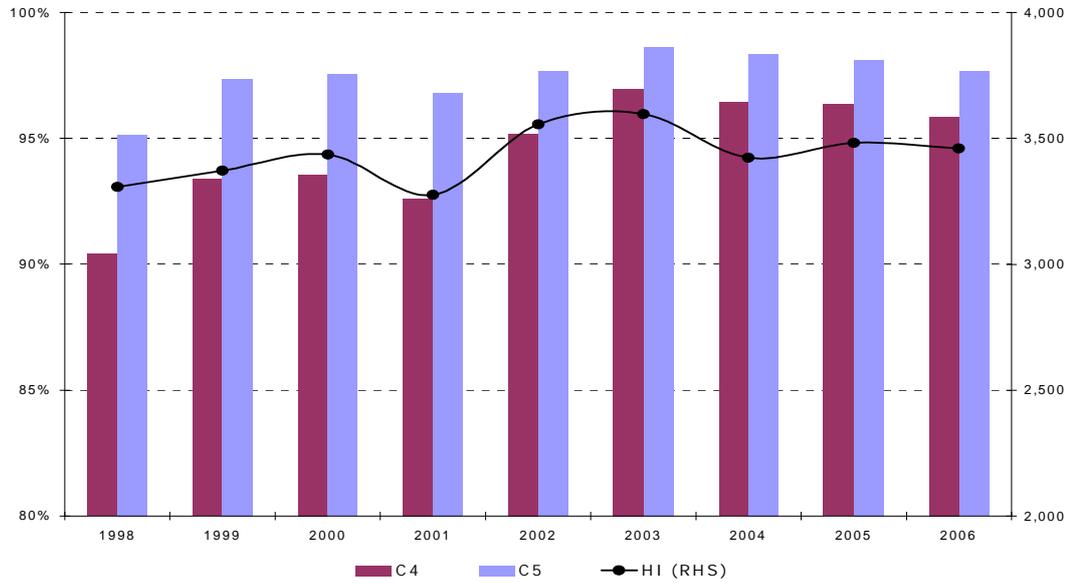
Whenever we restrict our analysis to subsets of companies in our dataset, e.g. whenever we consider listed companies only, concentration measures are calculated with respect to this subset of companies and their auditors only.¹⁰

Figures 2 and 3 depict the evolution over the period studied of the average values of our measures of concentration across all markets, based on the market definition comprising 52 markets. In Figure 2 we apply the respective market definition to all companies in our dataset, while for Figure 3 we only apply it to listed companies.

An important common feature of both figures is that C4, and to a lesser extent also C5 and HI, rise considerably during the years 2002 and 2003, that is, after the dissolution of Arthur Andersen. From 2004 onwards our measures indicate a slight decrease in the level of market concentration among auditors. In the case of listed companies HI exhibits a slightly declining pattern over the whole period, but this behaviour is not reflected in the other two measures of concentration that focus on just the biggest auditors within each market.

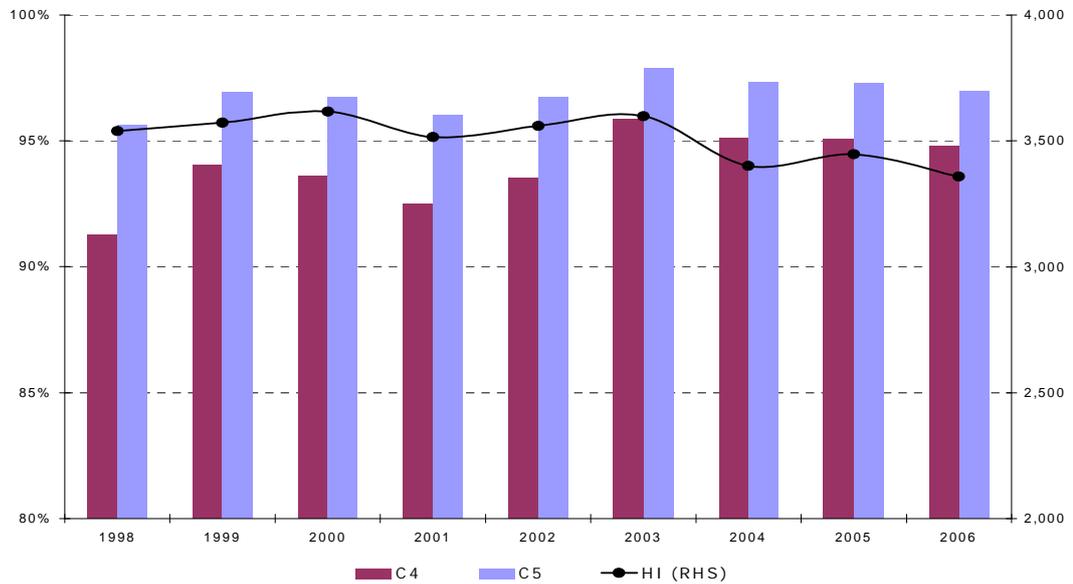
¹⁰ Unreported analysis shows that main results do not change if instead market concentration was always based on the auditors of all the companies (listed and private) in a given market.

Figure 2 Market concentration based on Model A and all auditors, 1998-2006



Source: Own calculations based on FAME data.

Figure 3 Market concentration based on Model A and auditors of listed companies only, 1998-2006



Source: Own calculations based on FAME data.

4.2.1 Discussion on concentration metrics

C4 and C5 are particularly useful to assess the impact of market concentration as a result of 4 or 5 auditors dominating the market for audits (e.g. for markets that are dominated by the Big-4 or Big-5 auditors). A high value of C4 is associated with a market where the

four largest auditing firms face little competition. However a high value of HI is more difficult to translate into combined market share of the Big-4 auditors.

Some key differences between, say, HI and C4 can be illustrated as follows. Suppose the biggest four auditors capture 80% of the market, and each auditor has a market share of 20%. The market is also made up of two mid-tier auditors, each of which has a market share of 10%. In this configuration HI is 1,800. However if a small auditor entered this market and captured 50% of the market share of one of the mid-tier auditors, HI would decrease to 1,750 even though nothing changes at the upper end of the audit market. Whether the real market configuration changes or not depends on the section of the market one is looking at. If the focus is on the top-tier auditors, then there is no change whatsoever. C4 yields this conclusion, since it is 80% in both cases. In this case HI gives the impression of a less concentrated market when in fact the high concentration in the upper end of the market remains structurally the same.

Now consider a situation where the market balance between the top-tier and mid-tier segments of the market remain the same, e.g. consider the case where the joint market of the four biggest auditors is still 80% but their market shares become slightly unbalanced: one of the Big-4 auditors has a market share of 25%, a second controls 15% of the market, whereas each of the other two has a market share of 20%. On this occasion HI goes up, suggesting a less competitive market, even though the combined market share of the top-tier auditors and the combined market share of the mid-tier auditors remain the same. Again, C4 (which remains unchanged) delivers the right message as the portion of the audit market controlled jointly by the four largest players is unchanged.

Since we are particularly interested in the effect of competition between top-tier and mid-tier auditors, we think C4 and C5 are probably the most appropriate metrics for our analysis. In particular C5 is relevant for the period before the dissolution of Arthur Andersen because many audit markets were dominated by the Big-5. From 2002 onwards, however, C5 does not capture competition among the biggest auditors as precisely as C4. As noted above, changes in HI are more difficult to interpret. Nevertheless, as a further robustness check on our findings HI is also included in our regression analysis.

4.3 Descriptive analysis

In all regressions considered in this section, the dependent variable is the natural logarithm of annual audit fees while the main dependent variables are the concentration measures discussed above. The control variables are those detailed in Section 3.1.4.¹¹

¹¹ Additionally we include a control for switching auditors (switch, see Section 5.3.1), as they have been found to be significant. In robustness checks reported in Appendix A2.5 we also include controls for merger activity and the market share of the auditor.

Table 4 reports some descriptive statistics for all the variables included in our panel-data regressions and for the full sample of companies.¹²

Table 4 Descriptive statistics

	Number of observations	Mean	Standard deviation	Minimum value	Maximum value
Audit fee (Log)	8,185	5.25	1.23	3.04	10.22
C4 (Model A)	8,185	0.95	0.05	0.73	1.00
C4 (Model B)	8,617	0.94	0.05	0.79	1.00
C5 (Model A)	8,185	0.98	0.03	0.80	1.00
C5 (Model B)	8,617	0.97	0.02	0.89	1.00
HI (Model A)	8,185	3,439.39	1,110.19	1,837.56	9,299.78
HI (Model B)	8,617	3,002.87	873.87	1,838.55	9,299.78
Inassets	8,185	12.74	2.06	5.06	19.56
Inassets squared	8,185	166.52	53.32	25.57	382.76
Inturnover	7,849	12.63	1.98	6.91	19.00
dloss	8,180	0.33	0.47	0.00	1.00
Current	8,179	719.98	28,758.44	0.09	2,069,450.00
Complex2	7,420	765.98	35,445.46	-197,333.90	2,956,333.00
tangratio	8,141	46.69	26.93	0.00	100.00
shtlever	7,426	13.16	20.97	0.00	575.00
Big-N	8,185	0.86	0.35	0.00	1.00
switch	7,553	0.06	0.24	0.00	1.00

Note: Model A is our market definition with 52 audit markets while Model B is our market definition with 21 audit markets.

Source: FAME.

As can be observed Model B, which is based on a broader market definition comprising 21 audit markets, results in slightly lower mean measures of concentration among auditors. This is not surprising since segments are more broadly defined in this model and so each of them is likely to include more auditors. HI experiences the largest relatively drop in its overall mean. However, the minimum values of all concentration metrics in this market definition turn out to be higher than those resulting from Model A (52 audit markets).

Table 4 also indicates that 86% of all annual audits (where the name of the auditor is clearly reported by FAME) were carried out by a Big-N auditor.

¹² For a definition of the variable switch, see Section 5.2. If not noted otherwise the statistics refer to Model A.

4.4 Econometric analysis and main results

The key findings of our econometric analysis are summarised in Table 5. The rows list the different market definitions and concentration measures considered (as well as whether listed companies or all companies were included in the analysis). The columns refer, in term, to the different time periods we look at.

Our regressions only consider audit markets that are sufficiently large and are made up of at least 10 companies; see Appendix A.1 for a complete list of markets finally used in the econometric analysis¹³. A plus indicates a positive relationship between the concentration variable being studied and annual audit fees (higher concentration results in higher audit fees), whereas a minus indicates a negative relationship between both variables. An “O” means that no link between concentration and audit fees could be established. The bigger the number of pluses or minuses a variable receives, the higher is the statistical significance of the link.¹⁴

Table 5 Market concentration and audit fees

	Concentration measure	Period considered		
		1998-2006	2002-2006	1998-2001
Model A, all companies	C5	O	+	O
	C4	O	+	O
	HI	-	---	O
Model A, listed companies	C5	O	++	O
	C4	O	+++	O
	HI	O	O	O
Model B, all companies	C5	O	O	O
	C4	+	O	O
	HI	O	O	O
Model B, listed companies	C5	--	O	O
	C4	O	++	O
	HI	++	+++	O

Source: ELSE based on FAME data.

¹³ The number of markets actually used was 33 for Model A and 17 for Model B, see Appendix A1 for a full list of markets.

¹⁴ Three signs refer to a high level of statistical significance. For example, the symbols +++, ++ and + indicate the coefficient is statistically significant at the 1, 5 and 10 per cent levels, respectively.

4.4.1 Description of main results

The main findings of our analysis of the link between market concentration and audit fees are as follows:

- During the period 2002 to 2006, namely after the collapse of Arthur Andersen, higher market concentration, particularly among the largest four auditors, is associated with higher audit fees paid by listed companies;
- During the period 1998 to 2001, namely before the collapse of Arthur Andersen, there is no strong link between market concentration and audit fees;
- During the whole period 1998 to 2006, the effect of market concentration on audit fees is ambiguous and depends on the measure of concentration and market definition used.

Discussion

Our results are based on the following considerations. We view models A and B as equally relevant. In addition, C4 is more likely to be suitable for the period after 2001 whereas C5 is better for the period 1998 to 2001. HI is relevant for both periods and we consider it most suitable for the period 1998-2006, during which the number of top-tier auditing firms changed. We also acknowledge the fact that it is not possible to predict with certainty which concentration measure is most suitable for our analysis as this judgement regarding measures and models can depend on many details that are beyond our control.

Our conclusions are therefore derived from the following decision framework: we argue that a positive link has been established if (for the relevant set of companies) no concentration measure is strongly and negatively correlated with audit fees¹⁵ and at least one measure is positively correlated with audit fees. By a similar token, we say a negative link has been established if no concentration measure is positively correlated with audit fees¹⁶ and at least one measure is strongly and negatively correlated with audit fees.¹⁷

The fact that for listed companies, during the period 2002 to 2006, C4 always exhibits a positive link strengthens our conclusions. Further support comes from the observation that usually the relevant indices are significant at least at the 5% significance level.

For the period 1998 to 2006, a positive link between audit fees and concentration exists only in Model B and for all companies. In this case the results depend very much on the underlying market definition (Model A or Model B) and concentration measure used.

¹⁵ At the 10% significance level.

¹⁶ At the 10% significance level.

¹⁷ If a certain concentration measure is not positively or negatively correlated with auditing fees (as indicated by an "O" in Table 5) this does not necessarily mean that a link does not exist, it might just be a sign that this particular measure or the underlying amount of data is inappropriate to find a link.

We have no evidence of a strong correlation between concentration and audit fees in the years preceding 2002, neither for listed companies nor for the set of all companies.

4.4.2 Further checks on robustness

Our regressions generally show high values of R^2 , indicating that the estimated models explain a great deal of the variability in audit fees. Furthermore the F tests indicate the regressions are overall statistically significant.

We have assessed the robustness of our results in several ways. In addition to the tests mentioned above, we also considered the following variations in specification:

- Different measures of the complexity and risk of the audit;
- Controlling for merger activity of the auditee;
- Controlling for the auditor's individual market share;
- Excluding companies that belong to the financial services sector;
- Applying market definitions based on auditee size and industry sector.

In general these robustness checks confirmed our main findings. (The most important ones are reported in Appendix A2.5)

In further (unreported) analysis, we considered models A and B for private companies only. For the period 1998-2006 we find no clear evidence that higher concentration is related to higher audit fees. The evidence for the periods 1998-2001 and 2002-2006 is more conclusive and shows that after 2002 the link is negative and before 2002 it is positive.

4.5 Magnitude of the effects

To get a better understanding of the magnitude of the impact concentration has on audit fees during the period 2002 to 2006, we use the econometric analysis and translate the established impact to hypothetical situations. Our calculations are only intended to provide basic orders of magnitude and should therefore be treated with caution, in particular if the changes in concentration we use for these calculations differ substantially from those observed in the actual data.

These extrapolations are based on the assumption that, apart from changes in market concentrations, everything else is kept constant.¹⁸ We do not consider individual audit firms or their clients. The magnitude changes in audit fees will be reported as changes in the average audit fee of listed companies only. So changes for individual companies can differ substantially from the average changes reported here.

¹⁸ In particular, we neglect changes in audit fees that can be partly explained by our yearly controls.

4.5.1 Scenario A

Consider first the impact on audit fees for listed companies of an increase in the market share of the largest four auditors during the period 2002-2006. This is the period after the dissolution of Arthur Andersen.

From the relevant tables in Appendix A2, we see that the coefficient for C4 is either 0.78 (Model A, Table 13) or 0.62 (Model B, Table 19). This implies that an increase in the joint market share of the Big-4 auditors by 10 percentage points (e.g. from 80% to 90%) leads to an increase in audit fees of approximately 7.8 % (Model A) or 6.2% (Model B).

4.5.2 Scenario B

Suppose a mid-tier auditor increases its market share from 1% (e.g., the market share of the fifth largest auditing company in 2006) to 5% by capturing listed clients previously audited by one of the Big-4. According to our analysis of listed companies for the period 2002-2006, this would lead to a decrease in audit fees of $4 \times 0.7\% = 2.8\%$ (note that 0.7 is the average of the coefficients for C4 from Models A and B). This means that the average audit fee paid by listed companies in our dataset in 2006 (i.e. £630,670) goes down by £17,658 and the total annual savings on audit fees, due to the decrease in concentration, paid by all UK-listed companies in our dataset (£518,409,000 in 2006) would be £14,515,452.

Table 6 illustrates the previous calculations for different percentage point changes in the market share held by the Big-4. In general for every additional percentage point captured by a mid-tier auditor from the Big-4 we have that the average audit fee (for a listed company) decreases by 0.7 % (average of Model A and Model B).

Table 6 Hypothetical impact of de-concentration on audit fees

	Decrease in C4 (percentage points)			
	1	5	10	15
Total decrease in average audit fees ¹⁹ (thousand GBP)	4.41	22.07	44.15	66.22
Total decrease in audit fees of UK plc's ²⁰ (million GBP)	3.63	18.14	36.29	54.43

4.5.3 Scenario C

Computing the impact of the collapse of Arthur Andersen on annual audit fees is difficult because, in our dataset, Arthur Andersen was the auditor of very large clients and therefore we do not have enough observations to perform this sort of analysis in a very

¹⁹ Only companies included in our dataset can be considered. All fees are for 2006.

²⁰ Only companies included in our dataset can be considered. All fees are for 2006.

robust way. Furthermore, we cannot identify the impact of concentration on audit fees if we restrict the analysis to the years 2001-2003. We thus use the coefficients of C4 for the period 2002-2006 as an approximation of the magnitude of this impact.

An estimate based on the data reported in Figure 3 indicates that for listed companies, C4 has on average increased from 92.5 (in 2001) to 95.9 (in 2003). This represents an increase of 3.4 percentage points. Hence the overall increase in audit fees paid by listed companies in that period was $3.4 \times 0.7\% = 2.38\%$, which suggests that the average cost in terms of higher audit fees for a UK-listed company as a result of the Arthur Andersen dissolution is of the order of £15,000.

4.6 The Big-N premium

Our analysis finds that it has a big impact on audit fees whether a company's auditor is one of the Big-N auditing firms or not. We find that over the entire period 1998-2006 the premium charged by a Big-N auditor was around 13%.²¹ For listed companies it was higher (approximately 15%), whereas unreported regression analysis shows that for private companies we cannot establish that a Big-N premium exists for the period 1998 to 2006.

However, during the period 1998 to 2001 we cannot establish that UK-listed companies paid more for being audited by a Big-N auditor (maybe due to insufficient number of observations). Finally in the period 2002-2006 the premium paid for being audited by a top-tier auditor was around 20%.²²

²¹ This can be deduced from Tables 9 and 15, where the coefficient of the Big-N dummy variable (dbigN) is approximately 0.13 (it actually varies from 0.130 to 0.136 depending on the concentration measure included in the regression and the model applied).

²² The relevant coefficients in Table 13 and 19 take values between 0.197 and 0.215, indicating that the premium is somewhere between 19.7% and 21.5%.

5.0 SWITCHING TO A NEW AUDITOR AND AUDIT FEES

Previous sections of the report focus on the relationship between auditing market concentration and level of audit fees paid by large UK companies. In this section we turn our attention to the connection between auditor switching and audit fees. As it is impossible to qualify and quantify all possible advantages and disadvantages of an auditor switch based on our limited data, throughout this section we analyse the impact of an auditor change on the subsequent audit fees paid by the client. It seems plausible that offering a discount on a new audit could be used by the auditor as a mechanism to compensate a prospective client for some of the potential other costs associated with the switch. A lower fee might also be the result of fiercer competition among auditors during the tender process. Hence in this section we attempt to both establish whether such a discount for new audits exists and to measure its magnitude. We also study whether discounts persist over time after the switch and, if they do, the pace at which they disappear, which would suggest that the audit fees eventually converge to the market average.

In sum, we find that:

- During the period 2002 to 2006, for listed companies there is a strong and negative correlation between switching auditor and audit fees: in its first year with a new auditor, the company's audit fee is 6.6% lower than that of a company that did not switch;
- The audit fee discount associated with a switch does not persist over time. The magnitude of the discount decreases in the years following the switch. After 3 to 4 years following the switch existence of a discount cannot be established any more.

This section is structured as follows. Section 5.1 describes switching in our dataset and Section 5.2 explains our switching indicators and what they measure. Section 5.3 reports the main findings.

5.1 Switching in our dataset

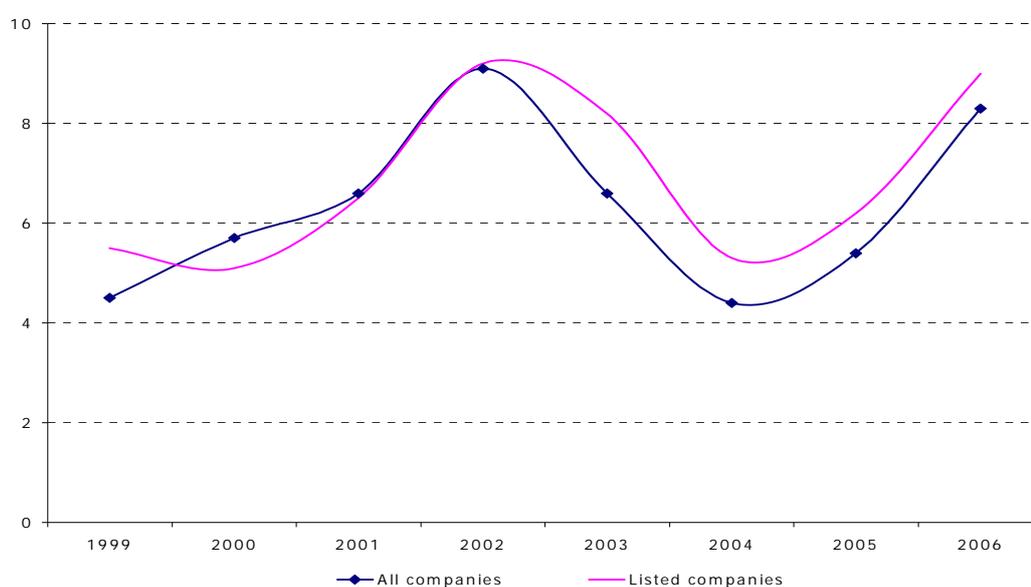
During the time period studied, companies do not change their auditor very often. Specifically we observe 484 changes of auditor between 1998 and 2006 (5.9 % of all audits are done by a different auditor than in the previous year).²³ For listed companies the total number of switches is 345 (6.7% of all audits), for private companies it is 90 (4.5% of all audits)

²³ Of which 95 can be attributed to a change of auditor following the Arthur Andersen dissolution.

Figure 4 reports the percentage of auditor switches in each year between 1999 and 2006 for all companies and listed companies.²⁴

The persistency in client-auditor relationship may suggest that, as pointed out above, companies generally benefit from a long-term relationship with the incumbent auditor. However it may also indicate a more fundamental behavioural problem in the market for auditing services or some form of resistance from company boards and audit committee chairs to switch auditor.²⁵ The analysis of these complex issues lies outside the scope of this report, though.

Figure 4 Evolution of auditor switches (%), 1999-2006



Source: ELSE calculations based on FAME data.

5.2 Our switching variables

In general, we assume that a switch in auditor took place in a given year if the auditor of a company (as reported in the FAME dataset) is different from the one in the previous year. If the name of the auditor changed but the new auditor resulted from a merger or takeover of the previous auditor, then we do not consider this as a switch.²⁶ If, for a given company and a given year, information on the previous auditor is missing then we assume that no information on switching for that company-year observation is available,

²⁴ We consider a change from Arthur Andersen to Deloitte & Touche after the collapse of the former as an auditor switch. Unreported analysis shows that the impact of a change of auditor on audit fees is still significant if this assumption is relaxed, though.

²⁵ For evidence on the latter, see Oxera (2006) Section 3.2.5.

²⁶ Mergers and takeovers accounted for are the following: Baker Tilly merged with HLBKiddsons (2002), Levy Gee was acquired by HLB Vautis Audit (2005), Blueprint was acquired by Tenon (2003). For the results reported in the main body of the report we consider a switch from Arthur Andersen to Deloitte&Touche (following the demise of the former) as an actual switch in auditor, but main findings are not significantly different if such a change in auditor is not considered a switch.

even if for that company the information on auditors in earlier and subsequent years is available and suggests that no change in auditor took place. In unreported analyses we find that filling those gaps where data suggest that a long-term relationship with a single auditor prevails does not substantially change our key findings.

We measure the impact of switching auditor on audit fees using four indicator variables (which we include in our econometric model, see Section 3.1). These variables take value one if the last switch in auditor happened 1, 2, 3 or 4 years ago, respectively. In particular if all four variables are equal to zero, meaning that there was no switch of auditor in any of the previous 4 years, this may indicate either that no switch occurred or that the switch took place in earlier years.

To check the robustness of our findings, we use an additional metric of auditor switching defined as the length (in years) of a new auditor-client relationship for those cases where we could safely infer from our dataset the starting point of this new relationship. This part of our analysis is thus restricted to only 1,378 company-year observations, its results are reported in Appendix A.3, Table 28.

5.3 Main results

5.3.1 Fee discount for new clients

We first look at the impact an auditor switch has on audit fees paid in the year of the switch. For the period 1998 to 2006 we find that switching auditor is strongly correlated with lower audit fees: in its first year with the new auditor, on average the company pays significantly²⁷ lower fees than a company that did not switch (see Appendix A.3 for details of the econometric analysis). Dividing the dataset into listed and private companies and analysing each group separately indicates that the negative effect of switching on audit fees can only be established for listed companies, where it is highly significant²⁸. For private companies, we cannot find such a link. In the remainder of this section we will therefore focus on listed companies only.

We also analyse if the impact of an auditor switch on audit fees differs depending on whether it occurred before or after the collapse of Arthur Andersen. Dividing the dataset into different time periods shows that the absolute impact of switching on audit fees is of similar magnitude before and after 2001. Table 8 reports the magnitude that a switch has on fees in percentage terms (in the subsequent year).²⁹

²⁷ At a significance level of 5%

²⁸ At a significance level of 1%

²⁹ For example in the period 1998-2001 the discount on fees for the first audit after a switch is 7%. The fee discount is approximately given by the value of the coefficient of the switching dummy in the regressions reported in Appendix A3.

Table 7 Fee discount as a result of auditor switch, 1998-2006

	Period considered			
	1998-2001	2001-2006	2002-2006	2003-2006
Fee discount in first year after switch	7.0%	5.1%	6.6%	5.9%

Source: ELSE based on FAME data.

5.3.2 Evolution of the fee discount for new clients

It seems reasonable to expect audit fee discounts (due to a switch in auditors) to be associated with the duration of the auditor-client relationship: auditing firms need to generate a profit from a new client in the long run and thus might want to reduce the discount in the years following the switch. We test this hypothesis using two approaches.

Approach 1

First we analyse whether audit fees depend on the length of a new client-auditor relationship. As we are interested in the evolution of audit fees over time for new relationships, we only consider those listed companies that changed auditor at least once during the period 1998-2006. For these companies we can establish a significantly³⁰ positive correlation between the number of years that went by since the last change of auditor (i.e. the number of years a company has been with the incumbent auditor) and the audit fee: the longer a client has been with the incumbent auditor (after a switch), the higher the audit fees paid (see Appendix A3, Table 28, for details of the analysis).

Approach 2

To better understand whether fees eventually go back to the average level charged to non-switching companies (and also to see how long this might take), we use four variables that indicate whether the most recent switch dates back one, two, three or four years.

Table 8 summarises the results of this analysis for different time periods.³¹ In the table we report the fee discount (in percentage terms) associated with a switch in auditor that took place 1, 2 3 or 4 years ago, respectively. In brackets we indicate the name of the variable that takes value one if a switch happened in the respective number of years ago (and zero otherwise).

³⁰ At the 10% level.

³¹ We ran the regressions for the entire dataset, i.e. we also included companies that never switched auditor.

Table 8 Fee discounts after switching for listed companies

	Period considered		
	2001-2006	2002-2006	2003-2006
1 year after switch (switch)	6.0%	7.9%	8.6%
2 years after switch (switch2)	4.5%	6.0%	8.2%
3 years after switch (switch3)	n.s.	n.s.	5.3%
4 years after switch (switch4)	n.s.	n.s.	n.s.

Source: ELSE based on FAME data.

For example, in the period 2001 to 2006 the fee paid by companies that switched auditor two years ago is on average 4.5% lower than the fee paid by non-switchers (or companies that had a switch more than four years ago). 'n.s.' ('not significant') in the table indicates that no impact on audit fees can be established, e.g. for the time period 2001-2006 the audit fee three years after a switch is not significantly different from the average audit fee.³² We do not consider years before 2001 to make sure that we have a sufficient number of switches that date back four years.³³

With the exception of the period 2003-2006, 3 years after an auditor switch there is no statistically significant difference in audit fees between the companies that switched and those that did not switch (at least not within the last four years). The results in Table 8 for periods 2001-2006, 2003-2006 and 2003-2006 suggest that audit fees stay below the average for a couple of years after a switch and that this discount decreases over time. F-tests reveal that this is indeed the case: whereas we cannot establish (in a statistically significant way) that the fee discount is reduced between the first and the second year after a switch, the discount can be shown to decrease within the first three (for period 2001-2006) or four years after a switch. Thus our conclusion is that at least for up to two years after a company has changed to a new auditor it will benefit from an audit fee discount. This discount, however, becomes smaller in subsequent years and is not significantly different from zero after 3 or 4 years.

³² At a significance level of 10%

³³ We repeated the analysis and used Model B as our basis for the calculation of C4. The main findings remain the same (unreported). In addition, we repeated the analysis and did not consider a change from Arthur Andersen to Deloitte & Touch after the collapse of the former as a switch. Again, we find no fee discount can be established 3 to 4 years after the change of auditor.

6.0 CONCLUDING REMARKS

This report studies the impact of market concentration and auditor switching on annual audit fees paid by large (listed and private) companies in the UK. We rely on parametric methods to analyse the strength and direction of the link between these variables. The findings suggest that there is a strong relationship between the degree of concentration in audit markets and higher audit fees paid by UK listed companies from 2002 onwards, and that companies that change auditor reap benefits from lower fees over three years after the switch.

In order to analyse the connection between the extent of concentration among auditors and the level of annual audit fees, we defined relevant markets for all companies in our dataset and then calculated measures of concentration within each of these markets. We considered two alternative market definitions as a means to check the sensitivity of our results to the underlying market boundaries. Alongside these, we performed additional robustness tests by looking at different time periods and types of companies, and by controlling for several factors that might explain the observed variability in audit fees. Reassuringly, our main findings are generally aligned.

REFERENCES

- Asthana, S., Balsam, S., and Kim, S., "The Effect of Enron, Andersen, and Sarbanes-Oxley on the Market for Audit Services," Working paper, June 2004.
- Basioudis, I. G., Geiger, M. A., and Papanastasiou, V., "Audit Fees, Non-audit Fees, and Auditor Reporting on UK Stressed Companies," Presented at the National Auditing Conference, Manchester, U.K., March 2006.
- Beattie, V., Goodacre, A., and Fearnley, S., "And there were four" A study of UK audit market concentration – causes, consequences and the scope for market adjustment," *J. Financial Regulation and Compliance*, 11(3), pp 250–265, 2003.
- Chi, W., "The Effect of the Enron-Andersen Affair on Audit Pricing," Working paper, Department of Accounting, National Chengchi University, November 2004.
- Feldman, E., "Basic Quantification of the Competitive Implications of the Demise of Arthur Andersen," *Review of Industrial Organization*, 29(3), pp 193–212, 2006.
- Fields, L. P., Fraser, D. R., and Wilkins, M. S., "An investigation of the pricing of audit services for financial institutions," *Journal of Accounting and Public Policy*, 23, pp53–77, 2004.
- Lee, D. S., "Auditor Market Share, Product Differentiation and Audit Fees," *Accounting and Business Research*, 26(4), pp 315–324, 1996.
- McMeeking, K. P., Peasnell, K. V., and Pope, P. F., "The effect of audit firm mergers on audit pricing in the UK," BAA Auditing SIG Conference, 11-12 March, 2005.
- Oxera, "Competition and choice in the UK audit market," Report prepared for Department of Trade and Industry and Financial Reporting Council, April 2006.
- Seetharaman, A., Gul, F. A., and Lynn, S.G., "Litigation risk and audit fees: evidence from UK firms cross-listed on US markets," *J. Accounting and Economics*, 33, pp 91–115, 2002.
- Simon, D.T. and Francis, J.R., "The Effects of Auditor Change on Audit Fees: Tests of Price Cutting and Price Recovery," *The Accounting Review*, 63(2), pp 255–269, 1988.

A1 INDUSTRY SECTORS

A1.1 List of markets used in the regressions for Model A

- Mining
- Extraction of crude oil and natural gas
- Agriculture
- Textile manufacturing
- Publishing
- Chemicals
- Plastics and rubber
- metals and metal products
- Machinery and equipment
- Office machines and electrical machinery
- Televisions and telephones
- Medical and optical instruments
- Motor vehicles
- Furniture
- Electricity, gas and water
- Construction
- Sale and maintenance of motor vehicles
- Wholesale
- Retail
- Hotels and restaurants
- Land transport
- Air transport
- Supporting and auxiliary transport
- Post and telecommunications
- Financial intermediation
- Insurance and pension funding
- Other financial services
- Real estate
- Renting machinery and equipment
- Software publishing
- Other computer related activities
- Other business activity
- Recreational, culture and sport

A1.2 List of markets used in the regressions for Model B

- Mining, extraction of crude oil and natural gas
- Agriculture
- Textile manufacturing
- Publishing

- Chemicals, plastics, rubber, metals and metal products, coke, refined petroleum,
- Other manufacturing (e.g., machinery and equipment, office machines and electrical machinery, televisions and telephones, medical and optical instruments, motor vehicles, furniture)
- Electricity, gas and water
- Construction
- Wholesale, retail
- Hotels and restaurants
- Transport
- Post and telecommunications
- Financial intermediation
- Insurance and pension funding
- Other financial services
- Other business activity
- Recreational, culture and sport

A2 ANALYSIS OF MARKET CONCENTRATION

A2.1 Model A (52 market segments) for all companies

Table 9 Impact of concentration on audit fees, 1998-2006

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.325*** (0.072)	0.323*** (0.072)	0.326*** (0.072)
assets2	-0.00333 (0.0028)	-0.00328 (0.0028)	-0.00337 (0.0027)
Inturnover	0.250*** (0.013)	0.250*** (0.013)	0.250*** (0.013)
dloss	0.0656*** (0.013)	0.0647*** (0.013)	0.0654*** (0.013)
tangratio	-0.000151 (0.00054)	-0.000142 (0.00054)	-0.000203 (0.00054)
complex2	0.000000313 (0.00000011)	0.000000296 (0.00000011)	0.000000309 (0.00000011)
shtlever	0.000621* (0.00033)	0.000628* (0.00033)	0.000639* (0.00033)
current	-0.000258*** (0.000062)	-0.000258*** (0.000062)	-0.000257*** (0.000062)
dbigN	0.132*** (0.029)	0.130*** (0.029)	0.131*** (0.029)
switch	-0.0421** (0.018)	-0.0426** (0.018)	-0.0429** (0.018)
C5	-0.129 (0.28)		
HI			-0.0000134* (0.0000069)
C4		0.193 (0.17)	
Observations	6250	6250	6250
R-squared	0.54	0.54	0.54

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

CONCENTRATION, AUDITOR SWITCHING AND FEES IN THE UK AUDIT MARKET

Impact of concentration on audit fees, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.565*** (0.11)	0.558*** (0.11)	0.549*** (0.11)
assets2	-0.0118*** (0.0041)	-0.0116*** (0.0041)	-0.0111*** (0.0041)
Inturnover	0.173*** (0.020)	0.173*** (0.020)	0.177*** (0.020)
dloss	0.0388** (0.019)	0.0388** (0.019)	0.0416** (0.019)
tangratio	0.00150* (0.00081)	0.00148* (0.00081)	0.00158* (0.00081)
complex2	0.000000227 (0.00000011)	0.000000223 (0.00000011)	0.000000268 (0.00000011)
shtlever	0.00112** (0.00048)	0.00112** (0.00048)	0.00113** (0.00048)
current	-0.0000397 (0.000081)	-0.0000423 (0.000081)	-0.0000355 (0.000081)
dbigN	0.204*** (0.041)	0.206*** (0.041)	0.208*** (0.041)
switch	-0.0405* (0.023)	-0.0399* (0.023)	-0.0427* (0.023)
C5	1.166* (0.70)		
HI			-0.0000368*** (0.000011)
C4		0.549* (0.32)	
Observations	3778	3778	3778
R-squared	0.54	0.54	0.54

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 10 Impact of concentration on audit fees, 1998-2001

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.180 (0.13)	0.173 (0.13)	0.172 (0.13)
assets2	0.00292 (0.0052)	0.00314 (0.0051)	0.00320 (0.0051)
Inturnover	0.242*** (0.021)	0.243*** (0.021)	0.243*** (0.021)
dloss	0.0811*** (0.019)	0.0812*** (0.019)	0.0809*** (0.019)
tangratio	-0.000681 (0.00083)	-0.000720 (0.00083)	-0.000728 (0.00083)
complex2	0.000000131 (0.0000012)	0.000000148 (0.0000012)	0.000000142 (0.0000012)
shtlever	-0.000636 (0.00066)	-0.000654 (0.00066)	-0.000656 (0.00066)
current	-0.000319*** (0.00012)	-0.000321*** (0.00012)	-0.000321*** (0.00012)
dbigN	-0.00417 (0.053)	-0.00415 (0.053)	-0.00550 (0.053)
switch	-0.0816*** (0.027)	-0.0815*** (0.027)	-0.0816*** (0.027)
C5	-0.264 (0.33)		
HI			-0.00000313 (0.0000090)
C4		-0.126 (0.24)	
Observations	2472	2472	2472
R-squared	0.54	0.54	0.54

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

A2.2 Model A (52 market segments) for listed companies

Table 11 Impact of concentration on audit fees, 1998-2006

	(1) C5	(2) C4	(3) HI
lnassets	0.305*** (0.068)	0.306*** (0.068)	0.306*** (0.068)
assets2	-0.00217 (0.0026)	-0.00222 (0.0026)	-0.00222 (0.0026)
Inturnover	0.261*** (0.016)	0.261*** (0.016)	0.261*** (0.016)
dloss	0.0856*** (0.013)	0.0858*** (0.013)	0.0858*** (0.013)
tangratio	0.000169 (0.00058)	0.000180 (0.00058)	0.000180 (0.00058)
complex2	0.0000000419 (0.000000090)	0.0000000414 (0.000000090)	0.0000000413 (0.000000090)
shtlever	0.00228*** (0.00051)	0.00228*** (0.00051)	0.00228*** (0.00051)
current	-0.0000516 (0.000068)	-0.0000534 (0.000068)	-0.0000535 (0.000068)
dbigN	0.150*** (0.025)	0.148*** (0.025)	0.148*** (0.025)
switch	-0.0473*** (0.017)	-0.0479*** (0.017)	-0.0479*** (0.017)
C5	-0.216 (0.31)		
HI			-0.000000106 (0.0000070)
C4		-0.00734 (0.18)	
Observations	3851	3851	3851
R-squared	0.77	0.77	0.77

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 12 Impact of concentration on audit fees, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
lnassets	0.466*** (0.092)	0.456*** (0.092)	0.456*** (0.092)
assets2	-0.00791** (0.0035)	-0.00756** (0.0035)	-0.00752** (0.0035)
Inturnover	0.198*** (0.023)	0.198*** (0.023)	0.199*** (0.023)
dloss	0.0506*** (0.017)	0.0509*** (0.017)	0.0524*** (0.017)
tangratio	0.00160** (0.00077)	0.00160** (0.00077)	0.00160** (0.00077)
complex2	0.000000398 (0.000000084)	0.000000378 (0.000000084)	0.000000405 (0.000000084)
shtlever	0.00293*** (0.00062)	0.00294*** (0.00062)	0.00299*** (0.00063)
current	0.0000790 (0.000080)	0.0000794 (0.000080)	0.0000851 (0.000080)
dbigN	0.197*** (0.033)	0.199*** (0.033)	0.208*** (0.033)
switch	-0.0660*** (0.020)	-0.0655*** (0.020)	-0.0622*** (0.020)
C5	1.149** (0.47)		
HI			-0.00000776 (0.000010)
C4		0.781*** (0.29)	
Observations	2410	2410	2410
R-squared	0.75	0.75	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 13 Impact of concentration on audit fees, 1998-2001

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.152 (0.14)	0.161 (0.14)	0.150 (0.14)
assets2	0.00447 (0.0059)	0.00403 (0.0059)	0.00453 (0.0059)
Inturnover	0.209*** (0.031)	0.209*** (0.031)	0.211*** (0.031)
dloss	0.0849*** (0.022)	0.0865*** (0.022)	0.0857*** (0.022)
tangratio	-0.00171 (0.0010)	-0.00173* (0.0010)	-0.00164 (0.0010)
complex2	-0.000000402 (0.0000018)	-0.000000379 (0.0000018)	-0.000000414 (0.0000018)
shtlever	0.00170* (0.00088)	0.00168* (0.00088)	0.00173* (0.00088)
current	-0.000293* (0.00016)	-0.000296* (0.00016)	-0.000285* (0.00016)
dbigN	-0.0148 (0.049)	-0.0107 (0.049)	-0.0212 (0.049)
switch	-0.0682** (0.027)	-0.0695*** (0.027)	-0.0685** (0.027)
C5	-0.291 (0.49)		
HI			0.00000936 (0.000010)
C4		-0.436 (0.28)	
Observations	1441	1441	1441
R-squared	0.76	0.76	0.76

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

A2.3 Model B (21 markets) for all companies

Table 14 Impact of concentration on audit fees, 1998-2006

	(1) C5	(2) C4	(3) HI
lnassets	0.271*** (0.070)	0.269*** (0.070)	0.271*** (0.070)
assets2	-0.00140 (0.0027)	-0.00137 (0.0027)	-0.00143 (0.0027)
Inturnover	0.264*** (0.012)	0.265*** (0.012)	0.265*** (0.012)
dloss	0.0675*** (0.013)	0.0668*** (0.013)	0.0673*** (0.013)
tangratio	-0.000185 (0.00052)	-0.000157 (0.00052)	-0.000172 (0.00052)
complex2	0.0000000326 (0.00000011)	0.0000000294 (0.00000011)	0.0000000319 (0.00000011)
shtlever	0.000473 (0.00033)	0.000483 (0.00033)	0.000464 (0.00033)
current	-0.000256*** (0.000061)	-0.000252*** (0.000061)	-0.000255*** (0.000061)
dbigN	0.135*** (0.028)	0.135*** (0.028)	0.136*** (0.028)
switch	-0.0483*** (0.018)	-0.0490*** (0.018)	-0.0483*** (0.018)
C5	-0.224 (0.34)		
HI			0.00000914 (0.0000096)
C4		0.306* (0.16)	
Observations	6596	6596	6596
R-squared	0.56	0.56	0.56

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 15 Impact of concentration on audit fees, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
lnassets	0.540*** (0.11)	0.539*** (0.11)	0.532*** (0.11)
assets2	-0.0110*** (0.0041)	-0.0109*** (0.0041)	-0.0107*** (0.0041)
Inturnover	0.181*** (0.020)	0.181*** (0.020)	0.182*** (0.020)
dloss	0.0437** (0.018)	0.0444** (0.018)	0.0441** (0.018)
tangratio	0.00127 (0.00079)	0.00128 (0.00079)	0.00131* (0.00079)
complex2	0.000000213 (0.00000011)	0.000000221 (0.00000011)	0.000000259 (0.00000011)
shtlever	0.00114** (0.00047)	0.00115** (0.00047)	0.00115** (0.00047)
current	-0.0000372 (0.000080)	-0.0000378 (0.000080)	-0.0000364 (0.000080)
dbigN	0.213*** (0.040)	0.212*** (0.040)	0.213*** (0.040)
switch	-0.0425* (0.022)	-0.0423* (0.022)	-0.0427* (0.022)
C5	1.074 (0.92)		
HI			-0.0000147 (0.000015)
C4		0.347 (0.36)	
Observations	3976	3976	3976
R-squared	0.55	0.55	0.55

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 16 Impact of concentration on audit fees, 1998-2001

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.104 (0.13)	0.106 (0.13)	0.105 (0.13)
assets2	0.00616 (0.0050)	0.00607 (0.0050)	0.00614 (0.0050)
Inturnover	0.264*** (0.020)	0.264*** (0.020)	0.265*** (0.020)
dloss	0.0814*** (0.018)	0.0815*** (0.018)	0.0822*** (0.018)
tangratio	-0.000935 (0.00080)	-0.000917 (0.00080)	-0.000903 (0.00080)
complex2	0.000000160 (0.0000012)	0.000000152 (0.0000012)	0.000000148 (0.0000012)
shtlever	-0.00132** (0.00064)	-0.00131** (0.00064)	-0.00129** (0.00064)
current	-0.000325*** (0.00011)	-0.000325*** (0.00011)	-0.000323*** (0.00011)
dbigN	0.00401 (0.050)	0.00470 (0.050)	0.00198 (0.050)
switch	-0.0817*** (0.026)	-0.0816*** (0.026)	-0.0807*** (0.026)
C5	0.248 (0.44)		
HI			0.0000182 (0.000013)
C4		0.0549 (0.23)	
Observations	2620	2620	2620
R-squared	0.56	0.55	0.56

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

A2.4 Model B (21 markets) for listed companies

Table 17 Impact of concentration on audit fees, 1998-2006

	(1) C5	(2) C4	(3) HI
Inassets	0.196*** (0.066)	0.199*** (0.066)	0.202*** (0.066)
assets2	0.00179 (0.0026)	0.00171 (0.0026)	0.00155 (0.0026)
Inturnover	0.281*** (0.015)	0.281*** (0.015)	0.282*** (0.015)
dloss	0.0825*** (0.013)	0.0827*** (0.013)	0.0826*** (0.013)
tangratio	0.000425 (0.00055)	0.000373 (0.00055)	0.000392 (0.00055)
complex2	0.0000000464 (0.000000090)	0.0000000417 (0.000000090)	0.0000000419 (0.000000090)
shtlever	0.00203*** (0.00051)	0.00203*** (0.00051)	0.00201*** (0.00051)
current	-0.0000450 (0.000067)	-0.0000517 (0.000067)	-0.0000556 (0.000067)
dbigN	0.164*** (0.024)	0.162*** (0.024)	0.163*** (0.024)
switch	-0.0551*** (0.016)	-0.0559*** (0.016)	-0.0559*** (0.016)
C5	-0.784** (0.36)		
HI			0.0000184** (0.0000092)
C4		0.105 (0.21)	
Observations	4241	4241	4241
R-squared	0.77	0.77	0.77

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 18 Impact of concentration on audit fees, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.415*** (0.091)	0.411*** (0.090)	0.415*** (0.090)
assets2	-0.00600* (0.0035)	-0.00582* (0.0035)	-0.00613* (0.0035)
Inturnover	0.212*** (0.022)	0.214*** (0.022)	0.215*** (0.022)
dloss	0.0552*** (0.016)	0.0562*** (0.016)	0.0561*** (0.016)
tangratio	0.00149** (0.00075)	0.00150** (0.00075)	0.00158** (0.00075)
complex2	0.000000396 (0.000000084)	0.000000372 (0.000000084)	0.000000450 (0.000000084)
shtlever	0.00284*** (0.00061)	0.00284*** (0.00061)	0.00282*** (0.00061)
current	0.0000847 (0.000079)	0.0000856 (0.000079)	0.0000822 (0.000079)
dbigN	0.214*** (0.032)	0.212*** (0.032)	0.215*** (0.032)
switch	-0.0591*** (0.019)	-0.0586*** (0.019)	-0.0571*** (0.019)
C5	0.901 (0.62)		
HI			0.0000385*** (0.000014)
C4		0.618** (0.29)	
Observations	2645	2645	2645
R-squared	0.75	0.75	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 19 Impact of concentration on audit fees, 1998-2001

	(1)	(2)	(3)
	C5	C4	HI
Inassets	0.0712 (0.13)	0.0738 (0.13)	0.0711 (0.13)
assets2	0.00796 (0.0056)	0.00782 (0.0056)	0.00795 (0.0056)
Inturnover	0.224*** (0.030)	0.224*** (0.030)	0.224*** (0.030)
dloss	0.0863*** (0.020)	0.0866*** (0.020)	0.0864*** (0.020)
tangratio	-0.000892 (0.00100)	-0.000889 (0.00100)	-0.000884 (0.00100)
complex2	-0.00000131 (0.0000015)	-0.00000125 (0.0000015)	-0.00000138 (0.0000015)
shtlever	0.00159* (0.00087)	0.00159* (0.00087)	0.00157* (0.00087)
current	-0.000257* (0.00015)	-0.000254* (0.00015)	-0.000256* (0.00015)
dbigN	-0.00282 (0.048)	-0.00522 (0.047)	-0.00760 (0.047)
switch	-0.0807*** (0.026)	-0.0811*** (0.026)	-0.0808*** (0.026)
C5	-0.453 (0.54)		
HI			0.00000846 (0.000013)
C4		-0.361 (0.35)	
Observations	1596	1596	1596
R-squared	0.77	0.77	0.77

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

A2.5 Robustness checks

Table 20 Model A for listed companies with auditor's market share, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
lnassets	0.479*** (0.091)	0.471*** (0.091)	0.470*** (0.092)
assets2	-0.00855** (0.0035)	-0.00823** (0.0035)	-0.00810** (0.0035)
Inturnover	0.194*** (0.023)	0.194*** (0.023)	0.194*** (0.023)
dloss	0.0463*** (0.017)	0.0467*** (0.017)	0.0480*** (0.017)
tangratio	0.00141* (0.00076)	0.00142* (0.00076)	0.00140* (0.00076)
complex2	0.000000415 (0.000000084)	0.000000399 (0.000000084)	0.000000408 (0.000000084)
shtlever	0.00299*** (0.00062)	0.00301*** (0.00062)	0.00306*** (0.00062)
current	0.0000739 (0.000079)	0.0000746 (0.000079)	0.0000812 (0.000079)
dbigN	0.134*** (0.035)	0.137*** (0.035)	0.139*** (0.035)
switch	-0.0591*** (0.020)	-0.0586*** (0.020)	-0.0553*** (0.020)
mktshr	0.343*** (0.069)	0.337*** (0.069)	0.367*** (0.070)
C5	1.016** (0.46)		
HI			-0.0000116 (0.000011)
C4		0.647** (0.29)	
Observations	2410	2410	2410
R-squared	0.75	0.75	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 21 Model B for listed companies with auditor's market share, 2002-2006

	(1)	(2)	(3)
	C5	C4	HI
lnassets	0.422*** (0.090)	0.418*** (0.090)	0.420*** (0.090)
assets2	-0.00631* (0.0035)	-0.00612* (0.0035)	-0.00635* (0.0035)
Inturnover	0.209*** (0.022)	0.211*** (0.022)	0.212*** (0.022)
dloss	0.0544*** (0.016)	0.0554*** (0.016)	0.0554*** (0.016)
tangratio	0.00141* (0.00075)	0.00143* (0.00075)	0.00150** (0.00075)
complex2	0.000000397 (0.000000084)	0.000000378 (0.000000084)	0.000000444 (0.000000084)
shtlever	0.00282*** (0.00061)	0.00281*** (0.00061)	0.00280*** (0.00061)
current	0.0000866 (0.000079)	0.0000876 (0.000079)	0.0000849 (0.000079)
dbigN	0.166*** (0.035)	0.166*** (0.035)	0.173*** (0.035)
switch	-0.0558*** (0.019)	-0.0555*** (0.019)	-0.0545*** (0.019)
mktshr	0.235*** (0.071)	0.226*** (0.071)	0.207*** (0.072)
C5	0.860 (0.62)		
HI			0.0000302** (0.000015)
C4		0.537* (0.29)	
Observations	2645	2645	2645
R-squared	0.76	0.76	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 22 Model A for listed companies with control for client's merger, 2002-2006

	(1) C5	(2) C4	(3) HI
lnassets	0.468*** (0.092)	0.459*** (0.092)	0.459*** (0.092)
assets2	-0.00798** (0.0035)	-0.00763** (0.0035)	-0.00759** (0.0035)
Inturnover	0.202*** (0.023)	0.201*** (0.023)	0.202*** (0.023)
dloss	0.0504*** (0.017)	0.0507*** (0.017)	0.0522*** (0.017)
tangratio	0.00165** (0.00077)	0.00165** (0.00077)	0.00165** (0.00077)
complex2	0.0000000402 (0.000000084)	0.0000000382 (0.000000084)	0.0000000410 (0.000000084)
shtlever	0.00296*** (0.00063)	0.00297*** (0.00062)	0.00301*** (0.00063)
current	0.0000845 (0.000080)	0.0000848 (0.000080)	0.0000904 (0.000080)
dbigN	0.197*** (0.033)	0.199*** (0.033)	0.207*** (0.033)
switch	-0.0654*** (0.020)	-0.0648*** (0.020)	-0.0615*** (0.020)
merger	-0.0197 (0.021)	-0.0195 (0.021)	-0.0188 (0.021)
C5	1.156** (0.47)		
HI			-0.000000625 (0.000010)
C4		0.784*** (0.29)	
Observations	2410	2410	2410
R-squared	0.75	0.75	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 23 Model B for listed companies with control for client's merger, 2002-2006

	(1) C5	(2) C4	(3) HI
Inassets	0.419*** (0.091)	0.415*** (0.090)	0.419*** (0.090)
assets2	-0.00610* (0.0035)	-0.00591* (0.0035)	-0.00623* (0.0035)
Inturnover	0.216*** (0.022)	0.218*** (0.022)	0.219*** (0.022)
dloss	0.0550*** (0.016)	0.0561*** (0.016)	0.0560*** (0.016)
tangratio	0.00154** (0.00075)	0.00156** (0.00075)	0.00164** (0.00075)
complex2	0.000000400 (0.000000084)	0.000000375 (0.000000084)	0.000000456 (0.000000084)
shtlever	0.00287*** (0.00061)	0.00287*** (0.00061)	0.00285*** (0.00061)
current	0.0000905 (0.000079)	0.0000916 (0.000079)	0.0000883 (0.000079)
dbigN	0.213*** (0.032)	0.211*** (0.032)	0.215*** (0.032)
switch	-0.0584*** (0.019)	-0.0579*** (0.019)	-0.0563*** (0.019)
merger	-0.0223 (0.020)	-0.0228 (0.020)	-0.0238 (0.020)
C5	0.922 (0.62)		
HI			0.0000393*** (0.000014)
C4		0.629** (0.29)	
Observations	2645	2645	2645
R-squared	0.75	0.75	0.75

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

A3 ANALYSIS OF SWITCHING

A3.1 Econometric outputs

Table 24 Impact of auditor switch on audit fees, 1998-2006

	(1) all companies	(2) listed companies	(3) private companies
lnassets	0.323*** (0.072)	0.306*** (0.068)	0.826** (0.32)
assets2	-0.00328 (0.0028)	-0.00222 (0.0026)	-0.0234** (0.012)
Inturnover	0.250*** (0.013)	0.261*** (0.016)	0.232*** (0.029)
dloss	0.0647*** (0.013)	0.0858*** (0.013)	0.0334 (0.036)
tangratio	-0.000142 (0.00054)	0.000180 (0.00058)	-0.000512 (0.0014)
complex2	0.0000000296 (0.00000011)	0.0000000414 (0.000000090)	-0.000000801 (0.0000013)
shtlever	0.000628* (0.00033)	0.00228*** (0.00051)	0.0000860 (0.00058)
current	-0.000258*** (0.000062)	-0.0000534 (0.000068)	-0.000441*** (0.00013)
C4	0.193 (0.17)	-0.00734 (0.18)	0.184 (0.50)
dbigN	0.130*** (0.029)	0.148*** (0.025)	-0.131 (0.15)
switch	-0.0426** (0.018)	-0.0479*** (0.017)	0.0316 (0.059)
Observations	6250	3851	1559
R-squared	0.54	0.77	0.31

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 25 Impact of auditor switch on audit fees (listed companies only)

	(1) 1998 - 2001	(2) 2001 - 2006	(3) 2002 - 2006	(4) 2003 - 2006
lnassets	0.161 (0.14)	0.415*** (0.084)	0.456*** (0.092)	0.464*** (0.11)
assets2	0.00403 (0.0059)	-0.00619* (0.0032)	-0.00756** (0.0035)	-0.00794* (0.0041)
Inturnover	0.209*** (0.031)	0.218*** (0.019)	0.198*** (0.023)	0.195*** (0.026)
dloss	0.0865*** (0.022)	0.0602*** (0.016)	0.0509*** (0.017)	0.0560*** (0.021)
tangratio	-0.00173* (0.0010)	0.00103 (0.00070)	0.00160** (0.00077)	0.00241*** (0.00086)
complex2	-0.000000379 (0.0000018)	0.0000000354 (0.000000086)	0.0000000378 (0.000000084)	-0.000000532 (0.00000089)
shtlever	0.00168* (0.00088)	0.00334*** (0.00061)	0.00294*** (0.00062)	0.00187** (0.00073)
current	-0.000296* (0.00016)	-0.0000236 (0.000072)	0.0000794 (0.000080)	0.0000413 (0.000089)
C4	-0.436 (0.28)	0.319 (0.22)	0.781*** (0.29)	0.610 (0.40)
dbigN	-0.0107 (0.049)	0.179*** (0.031)	0.199*** (0.033)	0.208*** (0.037)
switch	-0.0695*** (0.027)	-0.0512*** (0.019)	-0.0655*** (0.020)	-0.0588** (0.024)
Observations	1441	2844	2410	1967
R-squared	0.76	0.75	0.75	0.74

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 26 Evolution of audit fee discount (listed companies only)

	(1)	(2)	(3)
	2001 - 2006	2002 - 2006	2003 - 2006
Inassets	0.417*** (0.098)	0.422*** (0.11)	0.508*** (0.13)
assets2	-0.00617 (0.0038)	-0.00544 (0.0042)	-0.00889* (0.0048)
Inturnover	0.214*** (0.023)	0.193*** (0.025)	0.185*** (0.029)
dloss	0.0494*** (0.016)	0.0577*** (0.018)	0.0526** (0.022)
tangratio	0.00244*** (0.00076)	0.00231*** (0.00084)	0.00278*** (0.00096)
complex2	0.000000486 (0.000000082)	0.000000469 (0.000000082)	-0.000000185 (0.000000089)
shtlever	0.00415*** (0.00073)	0.00404*** (0.00077)	0.00232** (0.0010)
current	0.000107 (0.000088)	0.000134 (0.000091)	0.0000782 (0.00011)
C4	0.310 (0.24)	0.718** (0.30)	0.461 (0.43)
dbigN	0.208*** (0.032)	0.214*** (0.035)	0.218*** (0.039)
switch	-0.0603*** (0.021)	-0.0789*** (0.024)	-0.0863*** (0.029)
switch2	-0.0454** (0.023)	-0.0599** (0.025)	-0.0818*** (0.030)
switch3	-0.0189 (0.023)	-0.0352 (0.025)	-0.0532* (0.030)
switch4	0.0370 (0.023)	0.0284 (0.025)	0.0233 (0.029)
Observations	2376	2113	1725
R-squared	0.75	0.74	0.74

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.

Table 27 Impact of auditor's tenure on audit fees (companies that switched auditor at least once during the period)

	(1) all companies	(2) listed companies	(3) private companies
lnassets	0.611*** (0.14)	0.338** (0.15)	1.447* (0.81)
assets2	-0.0167*** (0.0056)	-0.00201 (0.0063)	-0.0440 (0.028)
Inturnover	0.183*** (0.032)	0.180*** (0.034)	0.148 (0.11)
dloss	0.0618** (0.025)	0.0565** (0.024)	0.264** (0.11)
tangratio	0.000528 (0.0011)	0.00126 (0.0012)	-0.00226 (0.0039)
complex2	-0.00000731 (0.00000096)	0.00000228 (0.00000088)	-0.00000641* (0.0000035)
shtlever	0.000275 (0.00040)	0.00178** (0.00081)	-0.000230 (0.00093)
current	-0.000274* (0.00016)	-0.000189 (0.00015)	-0.000767 (0.00062)
C4	0.440 (0.35)	0.333 (0.34)	4.310* (2.37)
dbigN	0.190*** (0.043)	0.157*** (0.038)	0.127 (0.35)
length	0.0344*** (0.0083)	0.0325*** (0.0076)	0.00884 (0.042)
Observations	1378	996	225
R-squared	0.58	0.74	0.41

Note: Standard errors in parenthesis. The symbols ***, ** and * indicate the variable is statistically significant at the 1%, 5% and 10% levels, respectively.

Source: ELSE based on FAME data.