



Audit market structure, fees and choice in a period of structural change: Evidence from the UK – 1998–2003

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ABSTRACT

This paper presents evidence on audit market concentration and auditor fee levels in the UK market in the crucial period of structural change following the PricewaterhouseCoopers' (PwC) merger and encompassing Andersen's demise (1998–2003). Given the current interest in auditor choice, analysis is also undertaken at the individual audit firm level and by industry sector. There is evidence of significant upward pressure on audit fees since 2001 but only for smaller auditees. Audit fee income for top tier auditors (Big 5/4) did not change significantly while the number of auditees fell significantly, consistent with a move towards larger, less risky, clients. A decomposition analysis of the aggregate Big 5/4 concentration ratio changes over the period identifies the impact of four distinct consumer-based reasons for change: leavers; net joiners; non-par auditor switches; and (only for the audit fees measure) audit fee changes. Andersen's demise markedly reduced the level of inequality among the top tier firms but PwC retained its position as a 'dominant firm'. On switching to the new auditor, former Andersen clients experienced an initial audit fee rise broadly in line with inflation, with no evidence of fee premia or discounting. They also reported significantly lower NAS fees, consistent with audit firms and auditees responding to public concerns about perceptions of auditor independence. There is no general evidence of knowledge spillover effects or cross-subsidisation of the audit fee by NAS. The combined findings provide no evidence to indicate that recent structural changes have resulted in anticompetitive pricing; the key concerns remain the lack of audit firm choice and issues concerning the governance and accountability of audit firms.

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1. Introduction

Rising audit market concentration has attracted the interest of regulators, market participants and academics for many years, especially since the audit firm mega-mergers of the 1980s and 1990s which reduced the global Big 8 to the Big 5. During that period, there was a general concern (based on the predictions of classical micro-economic theory) that excessive concentration would reduce competition, leading to an increase in the price of the services provided by the auditor (Financial Times, 1997). Paradoxically, there was also concern, based on observed market behaviour, regarding excessive competition and low-balling (e.g. CAJEC, 1992). From an industrial economics viewpoint, high seller concentration can both harm consumers and also benefit them through, for example, economies of scale and scope. Although concerns about the so-called

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'mega-mergers' on competition were raised, in general the regulatory conclusion was that the mergers would be unlikely to substantially lessen competition (Goddard, 1998; Thavapalan, Moroney & Simnett, 2002).

A further major shock to the system of financial reporting and auditing arose when the US energy giant, Enron, failed in 2001. This event, along with other financial scandals in the US, led to the passage of the Sarbanes-Oxley Act in 2002, which instituted reforms designed to restore confidence in corporate governance. Given the global nature of capital markets and further scandals in Europe (e.g. Parmalat), there have been moves to adopt Sarbanes-Oxley style reforms throughout Europe and elsewhere (Oxley, 2007; Quick, Turley & Willekens, 2007). In June 2002, Andersen, one of the top five audit firms in the world, was convicted of obstruction of justice for shredding documents related to Enron.¹ As a result, the firm lost its auditing license in the US.² In August 2002, the firm ceased business and, in the UK, was acquired by Deloitte & Touche, reducing the number of big accounting firms from five to four. In the US, the Andersen business was dissolved and former Andersen clients switched to other, mainly Big 4, audit firms. This event sparked further intense debate, which is ongoing, about competition and audit quality in the audit market (e.g., EC, 2002, 2008; OFT, 2002; GAO, 2003; Oxera, 2006, 2007; FRC, 2006a, 2006b, 2006c, 2007a, 2007b, 2009; US Treasury, 2008) and provides motivation for the present study.

Immediately following Andersen's demise, in the US the General Accounting Office (GAO) studied the effect of consolidation but found no evidence of impaired competition (GAO, 2003). Prior to Andersen's acquisition, the EC also examined the possible impact of the acquisition, concluding that there was no danger of the creation of a single dominant firm since Andersen and Deloitte were the smallest of the Big 5 firms (EC, 2002). More recently, the GAO has updated its report on audit market concentration, concluding that, in 2006, the Big 4 continue to dominate the large company market segment while concentration has eased in the small and mid company market segments (GAO, 2008). Additionally, the US Treasury received a final report from the *Advisory Committee on the Auditing Profession* (2008), a body set up by the US Treasury in 2007. One of the principal topics considered by the committee is audit market competition and concentration (the others being human capital and firm structures and finances). The report makes six recommendations in relation to this topic, including the reduction of barriers to entry for small auditing firms.³

In the UK, a report on competition and choice in the UK audit market was commissioned by the UK Department of Trade and Industry/Financial Reporting Council (Oxera, 2006).⁴ This was followed by discussion papers on choice in the UK audit market and promoting audit quality (FRC, 2006a, 2006b, 2007c) and by reports on choice (FRC, 2007a, b, 2009). Stakeholders expressed a strong preference for market-led solutions to the problem of restricted choice in the market for audit services to public interest entities in the UK and proposed a package of 15 recommendations designed to lessen concentration over the medium term. These recommendations require action by all market participants including audit firms, investors, companies, regulators and legislators.⁵

Academics have also investigated the impact of Andersen's dissolution on concentration, with Beattie et al. (2003) predicting that the acquisition would increase the Big 4's UK listed clientele to 72.8% of all audit clients (96.3% in terms of audit fees). In terms of individual firm market share, it was projected that Deloitte would become the third largest audit firm in the UK, accounting for 19.2% of the total market (based on audit fees).

However, as the EC and Beattie et al. (2003) studies were based on pro-forma figures, there is no published study that documents the *actual* impact of Andersen's dissolution in the UK. Further, since these studies cover only a very short period of time, the extent of change in concentration in the UK listed company audit market in recent years is not yet fully documented. This is especially true for the period following the Price Waterhouse and Coopers & Lybrand merger in 1998. To our knowledge, the only UK study that offers a detailed investigation of audit market concentration among the entire population of listed companies during the 2000s is Beattie et al. (2003). Previously, studies undertaken by Briston and Kedslie (1985), Moizer and Turley (1987, 1989), Beattie and Fearnley (1994), Peel (1997),⁶ and Pong (1999) jointly cover the period from 1972 to 1995.⁷ The study by Pong and Burnett (2006) examines the years 1997 and 2001. Figures reported in recent studies commissioned or produced by regulators (Oxera, 2006; POB, 2006, 2007, 2008; FRC, 2007b) offer limited insights into the structure of the market, due to restricted samples or the use of measures based on only number of audits. Recent academic

¹ On 31 May 2005, the US Supreme Court announced its unanimous decision to reverse this conviction.

² The firm also audited Worldcom, another company involved in accounting scandal. This added another blow to Andersen and contributed to its dissolution.

³ The six recommendations relating to concentration and competition are: reduce barriers to the growth of smaller auditing firms consistent with an overall policy goal of promoting audit quality; monitor potential sources of catastrophic risk faced by public company auditing firms and create a mechanism for the preservation and rehabilitation of troubled larger public company auditing firms; the PCAOB, in consultation with others, to determine the feasibility of developing key indicators of audit quality and effectiveness and requiring auditing firms to publicly disclose these indicators; promote the understanding of and compliance with auditor independence requirements among auditors, investors, public companies, audit committees, and boards of directors, in order to enhance investor confidence in the quality of audit processes and audits; annual shareholder ratification of public company auditors by all public companies be adopted; enhance regulatory collaboration and coordination between the PCAOB and its foreign counterparts.

⁴ The Financial Reporting Council (FRC) is the UK's independent regulator responsible for promoting confidence in corporate reporting and governance.

⁵ They are intended to: "increase the feasibility of investment in the supply of audit services to public interest entities by existing non-Big 4 firms or new firms; reduce the perceived risks to directors of selecting a non-Big 4 firm; improve the accountability of boards for their auditor selection decisions; improve choice from within the Big 4; reduce the risk of firms leaving the market without good reason; and reduce uncertainty and disruption costs in the event of a firm leaving the market."

⁶ Peel (1997) includes quoted and unquoted public limited companies and private companies.

⁷ Another study investigates the frequency of individual changes during the 1990s but not the overall level of concentration (Moizer and Porter, 2004).

studies are also based on restricted samples: McMeeking (2007) reports on the FTSE 100 while McMeeking et al. (2007) report on 309 listed companies in 2002.

The present study seeks to provide answers to the following specific research questions with respect to the UK domestic listed company audit market during the crucial period of structural change 1998–2003:

1. Have audit fee rates changed significantly during the period?
2. What was the aggregate level of audit market concentration following the PricewaterhouseCoopers' merger and immediately following Andersen's demise (i.e., 1998–2003) and did it change significantly?
3. What market shares did individual firms hold during this period and to what extent are the larger mid-tier firms in a position to compete in the listed company market?
4. What is the relative importance of joiners, leavers and switchers in explaining the overall change in aggregate audit market concentration?
5. Immediately following Andersen's demise, who dominated the market at industry level?
6. Who audits former Andersen clients and did their audit and/or non-audit services (NAS) fees change significantly in the short-term?

The specific contributions of the paper are fourfold. First, it provides a discussion of both the traditional and contemporary theory of industrial economics and its limitations in relation to making predictions about real markets (and the audit market in particular.) Second, it presents a descriptive analysis of the structure of the entire population of the listed company market (where existing studies cover only restricted samples) and at a detailed level (industry sector and individual firm) for a crucial period of structural change. Third, it offers insights into the complex dynamics underlying observed changes in market structure by undertaking a decomposition analysis. Fourth, it contributes to the growing, and conflicting, Andersen-related literature by (i) analysing the short-term impact of this event in the UK, where no study has yet been published; (ii) documenting the impact on market structure; (iii) analysing the fee impact of the Andersen dissolution, controlling for company size; and (iv) evaluating the possible impact of NAS fee cross-subsidisation on audit fees.

Due to the global nature of many large companies, the capital markets and the audit firm networks, the characteristics of the UK listed company audit market are shared with many other markets worldwide (FRC, 2006a: p. 8). Thus, the findings and conclusions from the present study have potential relevance in the global setting. Notwithstanding this, however, national markets do have specific characteristics and features. For example, the manner of the Andersen dissolution varied across countries – in the UK most clients transferred to Deloitte & Touche, in Australia most transferred to Ernst and Young and in the US the spread was fairly wide. In the UK, Deloitte & Touche (thereafter to be known as Deloitte) offered partnership or employment to 260 Andersen UK partners and around 3500 UK employees. Andersen's associate law firms were not involved in the agreement and Andersen's insolvency/corporate restructuring division decided not to join Deloitte & Touche (EC, 2002). Andersen partners are reported to have voted 'overwhelmingly' in favour of the acquisition⁸; so it is likely that most audit partners did remain with Deloitte, at least in the short-term.

The remainder of this paper is organised as follows. The next section provides a brief overview of the economic theory on market structure and behaviour, before considering the unique features of the audit market setting and discussing the factors that lead to changes in market concentration. This literature section goes on to review prior empirical studies of audit market concentration, the consequences of market concentration and the impact of Andersen's demise on audit pricing. Section 3 outlines the methods used to measure audit market concentration, data sources and data collection methods. Section 4 presents the results and discussion. Finally, Section 5 concludes the study.

2. Related literature and empirical studies

2.1. Industrial economics: traditional and contemporary theory

From the 1940s until the 1970s, the study of industrial organisation centred on the Structure-Conduct-Performance (SCP) paradigm, which posits that there is a direct link from structure, to conduct, to performance. The implication is that the more concentrated an industry, the more market power⁹ the organisation exercises and thus the larger the deviation from competitive pricing. This view resulted in aggressive antitrust policy in the US and Europe (Pepall, Richards & Norman, 2008).

Over time, it was realised that increased concentration, when combined with cost efficiencies, does not necessarily lead to higher prices. In equilibrium, both concentration and performance are endogenously determined by underlying cost and demand parameters (Beattie, Goodacre & Fearnley, 2003). Thus, more efficient firms should grow faster than less efficient firms resulting in a more concentrated industry structure.

In the 1970s, researchers' focus shifted from the study of market structure (S) and performance (P) to the study of conduct (C) (i.e., strategic behaviour). It was gradually realised that the decisions made by firms regarding pricing, nature of product/

⁸ See <http://news.bbc.co.uk/1/low/business/1920887.stm>.

⁹ Market power refers to conditions where the providers of a service can consistently charge prices above those that would be established by a competitive market.

service, expansion and investment feed back to affect structure. Strategic interaction was modelled using (non-cooperative) game theory, giving rise to the ‘new industrial organisation’ theory of the 1980s and which continues to the present. It was shown that it is difficult to construct an economic model in which there are significant merger gains due to cost efficiencies – this is the ‘merger paradox’. As a consequence of these theoretical ambiguities, competition regulation must also rely on empirical analysis to predict *ex ante* and observe *ex post* the effects of changes in market structure (Pepall et al., 2008, ch. 16).

2.2. The audit market setting

The applicability of industrial organisational theory to the audit market is reviewed by Yardley, Kaufman, Cairney and Albrecht. (1992) and Beattie and Fearnley (1994). The unique characteristics of the audit market include: inelastic demand due to statutory requirement for audit; regulated activity; the unobservability of quality or audit costs; and the possibility of cross-subsidisation of audit fees arising from the provision of non-audit services (NAS) and knowledge spillovers (Stein, 2006). Consequently, the determinants and consequences of concentration are especially difficult to assess using theoretical analysis and, therefore, must be investigated empirically. As audit firm costs are unobservable, audit fees (revenues rather than profits) must generally be used to proxy for profits.

Key general influences on the audit market are economic, political and regulatory in nature: stage in the economic cycle, shocks caused by financial scandals such as Enron and regulatory intervention into the audit market (e.g. corporate governance codes; US Sarbanes-Oxley Act of 2002). The demand from company managers, company board and shareholders for low cost versus high quality audits varies over time. The actual level of concentration and competition (both price and quality) is the result of complex interactions between these general influences, mediated by specific company and audit firm factors. The scandal associated with Andersen’s demise gave rise to a unique merger situation in which the demand for monitoring, which is costly, increased. However, to set against this, the selection of an audit firm requiring a new audit team incurs costly switching costs.

Given the audit firm’s demise, companies were forced to change from Andersen acting as both auditor and as the firm providing the consultancy reflected in the NAS reported in the financial statements. They could choose whether to use the newly appointed auditor (resulting in reported NAS) or a different firm to provide NAS (and zero reported NAS). Given the political pressure to avoid potential conflict of interests in joint provision, the reported NAS might be expected to fall to reduce the perceived (or real) threat to auditor independence. Alternatively, knowledge spillovers and/or the new auditor’s desire for increased fees and profit via cross-subsidisation of the audit fee might lead to increased reported NAS.

2.3. Sources of change in market concentration

There are three principal sources of change in concentration: change in the set of consumers; change in the set of providers; and realignments (switches). Change in the set of consumers results from companies entering or exiting the market through initial public offerings, mergers, insolvencies, delisting, re-admission and temporary suspension (Beattie et al., 2003).

Change in the set of suppliers arises from audit firm merger or demise and new entrants. Mergers and acquisitions enable audit firms to expand their business to achieve greater economies of scale and also industry-specific expertise (GAO, 2003). Gramling and Stone (2001) note that auditor specialisation has become both a minimum requirement and a barrier to entry in the audit service market, due to professional standards and emergent risk-based audit technologies that require industry expertise to be integrated into their audit approaches. Other barriers to entry are high capital requirements, lack of recommendation by capital market participants, high litigation risk and insurance costs, the need for international coverage, and international management structures, particularly in the case of the audit market for public listed companies (GAO, 2003; Oxera, 2007).^{10, 11} The demise or merger of large audit firms, though very rare, is also popularly thought to increase market concentration. Interestingly, however, neither Comunale and Sexton (2003) nor Duxbury, Moizer and Wan-Mohamed (2007) produce this result using Markov chain modelling in relation to the PricewaterhouseCoopers merger. Further, based on EU data, Ballas (2005) did not find that concentration increased following Andersen’s demise.

Voluntary realignments are said to occur where companies initiate the auditor change; in the UK and many other countries this requires shareholders’ approval.¹² If there is an underlying preference for the leading suppliers (currently the Big 4 firms), then these realignments, provided that other factors remain equal, will result in rising concentration (Beattie and Fearnley, 1995; Beattie et al., 2003). Audit firm resignations are uncommon and signal forced change for the client company.¹³

¹⁰ Barriers to entry restrict new entrants to the market at the top end in particular.

¹¹ The OFT (2004, paras 4.16–4.18) reported that the B4 firms have been subject to some of the highest cost increases but that professional indemnity insurance remains available to all.

¹² The main reasons for voluntary realignment in the UK during the 1990s have been shown to be high audit fee, dissatisfaction with the auditor’s ability to detect problems, and changes in company’s top management (Beattie and Fearnley, 1998).

¹³ Moizer and Porter (2004, pp. 63–65) report that, out of 609 auditor changes, there were 294 (48%) auditor resignations, as evidenced by letters filed with the company registrar. However, the audit partners interviewed by them suggested that ‘genuine mid-term resignations are very rare’. They explained that most resignations resulted from the practice of putting audits out to tender; i.e. the existing auditor ‘resigns’ when a new auditor is appointed. Such evidence casts serious doubt on the validity of categorising auditor changes based on resignation letters.

However, the political climate is believed to have caused some audit firms (especially the Big 4) to reassess the risk profile of their client portfolio and not seek reappointment in the case of 'risky' clients (Coffee, 2006, p. 166).¹⁴

2.4. Empirical studies of concentration in the UK listed company audit market

The number of audit firms active in the market has been used as an indicator of market structure. The two concentration measures reported in prior studies are the *k*-firm concentration ratio (CR) and, less commonly, the Hirschman–Herfindahl index (HI). These measures are based on either number of audits or audit fees. Table 1 summarises the findings from 15 prior academic and professional studies on concentration in the UK market, covering the 35 year period 1972–2007. By organising the findings according to time and measure, the trend over time is revealed.

Column 3 of Table 1 show that great care must be taken when comparing the findings from different studies and what is included in the definition of listed companies can vary greatly. In several studies (Moizer and Turley, 1987, 1989; McMeeking, 2007), only the largest companies are included, while in another (Oxera, 2006) there is a bias towards the largest companies. Some studies include only a sample of companies (McMeeking, Peasnell & Pope, 2007) while others exclude Alternative Investment Market (AIM) companies, which are generally smaller than main market companies. The number of companies on the main market has been declining steadily for 10 years, while the number of AIM companies has been rising at a much faster rate. For this reason, it is increasingly important that studies include this sector of the listed company market to avoid the upward distortion of the large-company focus on concentration measures based only on the main market. Finally, two studies (Pong, 1999; Pong and Burnett, 2006) exclude investment trusts, although this will have no systematic effect provided that they have a similar size distribution to the other companies included in the sample.¹⁵ These choices greatly affect the number of companies included in the 'UK listed' sample (see column 4 of Table 1).

Notwithstanding these sampling differences, the general trend over time is one of increasing concentration. In discussing this trend, results from Moizer and Turley (1987, 1989) (rows 1 and 2) and FRC (2007b) (final row) have been ignored due to the restricted samples used. The number of active audit firms has fallen from 362 in 1984 to 85 in 2002 (the figure of 66 for 2001 reported by Pong and Burnett (2006) can perhaps be attributed to their exclusion of some listed companies).¹⁶ The four-firm concentration ratio (CR4), based on number of audits, has risen from 0.38 in 1984 to 0.83 in 2006. Evidence based on the more informative audit fee measure is more limited, but the trend is from 0.77 in 1991 to between 0.93 and 0.97 in 2003/5 (depending on the sample used). Measures of the Herfindahl index based on audit fees indicate a significant increase in concentration (15.9 in 1992 rising to 24.8 in 2001).

Few studies report a comprehensive set of concentration indicators, and the most recent studies to offer a reasonably full picture are Pong (1999) for 1995 and Pong and Burnett (2006) for 1997 and 2001. In particular, the recent official studies (the Oxera Report commissioned by the UK Department of Trade and Industry/Financial Reporting Council and the UK Public Oversight Board (POB) annual accountancy profession statistics) focus on CR4 for a restricted (and unreported) number of companies.

In a published study of the entire population of UK listed companies, Beattie et al. (2003) analysed the effect of Andersen's demise on audit market concentration (on a *pro forma* basis) and estimated that the top four firms were likely to increase their market share from about 67% to 73% and from about 90–96% on the basis of number of audits and audit fees, respectively. The study identified that the levels of concentration were significantly higher in premier market segments (i.e. FTSE 100 and 250) and in certain industry sectors. Based on actual data drawn from Public Accounting Reports, Feldman (2006) reports that Andersen's exit from the market increased concentration by the top four firms from 85% to 95%.

High and rising levels of audit market concentration have been reported in numerous academic studies undertaken in non-UK countries (e.g., in the US: Wolk, Michelson & Wooton, 2001 and GAO, 2003; in Australia: Thavapalan et al., 2002; in Germany: Quick and Wolz, 1999; in international markets: Choi and Zeghal, 1999; Narasimhan and Chung, 1998; in the EU: Ballas, 2005). For example, in the US the top four firms audited 63% of total public companies' sales in 1988, rising to 71% by 1997 and 99% by 2002 (GAO, 2003).¹⁷

2.5. Evidence on the consequences of concentration

Evidence from audit market concentration studies suggests that increased market concentration does not necessarily decrease competition. For instance, while the merger between Price Waterhouse and Coopers & Lybrand increased the Big 5 market share at the aggregate market level, Thavapalan et al. (2002) report that, for a number of industry sectors in Australia, a more equitable spread of audit clients between the Big 5 firms was achieved. The GAO (2003, 2008) studies also found no

¹⁴ The available evidence on this, which relates to the US market, is mixed - Johnstone and Bedard (2004) and Schloetzer (2006) find evidence that Big N firms retain clients with lower audit risk, while Landsman et al. (2009) attribute the adjustments in audit client portfolios to Andersen-induced capacity constraints rather than client risk aversion.

¹⁵ Investment trusts are generally excluded because a full set of financial data is not available. C4 (based on audit fees) for investment trusts in 2002 was 0.90 (calculated from Table 3, p. 259 of Beattie et al., 2003) in comparison with 0.89 across all sectors.

¹⁶ The figure of 85 firms in 1982 is based on the FT 500 only; the figure of 84 in 2003 is a *pro forma* figure. While Pong and Burnett (2006) include AIM companies in their sample (personal communication, 7 January 2008), their sample size is somewhat smaller than ours (see Table 2).

¹⁷ Until recently, audit fee data was not publicly available in the US.

Table 1

Concentration in the UK listed company audit market: evidence from prior studies 1972–2007.

Time	Paper	Sample	Sample size	No. of active audit firms	No. of audits					Audit fees				
					CR4	CR6	CR8	CR20	H Index	CR4	CR6	CR8	CR20	H Index
1972	Moizer and Turley (1987, 1989)	FT 500	498	144	0.37	0.44	0.50		4.6	0.47	0.60	0.66	7.1	
1982	Moizer and Turley (1987, 1989)	FT 500	499	85	0.42	0.54	0.63		6.6	0.54	0.69	0.79	9.4	
1984	Briston and Kedsie (1985)	Domestic		362	0.38	0.49	0.57	0.76						
1987	Beattie and Fearnley (1994)	Domestic inc USM ^a	1642	216	0.43	0.55	0.64	0.83						
1988	Beattie and Fearnley (1994)	Domestic inc USM ^a	1769	191	0.45	0.57	0.67	0.86						
1989	Beattie and Fearnley (1994)	Domestic inc USM ^a	1871	174	0.45	0.57	0.68	0.88						
1990	Beattie and Fearnley (1994)	Domestic inc USM ^a	1978	167	0.59	0.72	0.79	0.90						
1991	Beattie and Fearnley (1994)	Domestic inc USM ^a	2070	166	0.59	0.72	0.79	0.90						
1991	Pong (1999)	Inc USM; exc inv trusts	1211		0.57	0.70	0.79			0.77	0.89	0.93	15.9	
1992	Pong (1999)	Inc USM; exc inv trusts	1222		0.58	0.71	0.79			0.79	0.90	0.94		
1993	Pong (1999)	Inc USM; exc inv trusts	1237		0.59	0.73	0.80			0.80	0.91	0.94		
1994	Pong (1999)	Inc USM; exc inv trusts	1320		0.61	0.74	0.82			0.79	0.92	0.95		
1994/5	Narasimhan and Chung (1998)	Domestic	1400		0.61	0.75	0.82		16.7 ^b					
1994/5	Peel (1997)	Inc USM and AIM ^c	1865			0.78								
1995	Pong (1999)	Inc USM; exc inv trusts	1401	106	0.60	0.75	0.82			0.79	0.92	0.94	17.0	
1997	Pong and Burnett (2006)	Inc AIM; exc inv trusts	1280	86	0.61	0.77		11.4		0.81	0.94		17.6	
2001	Pong and Burnett (2006)	Inc AIM; exc inv trusts	1094	66	0.64			13.4		0.86			24.8	
2002	McMeeking et al. (2007)	Sample of non-financial	309		0.80			22.0		0.88			23.0	
2002	Beattie et al. (2003)	Inc AIM ^c	2180	85	0.67		0.86			0.89				
2003 ^d	Beattie et al. (2003)	Inc AIM ^c	2180	84	0.73		0.89			0.96				
2004	Oxera (2006)	Selected listed exc AIM ^e	676							0.97				
2005	Oxera (2006)	Selected listed exc AIM ^f	865							0.93				
2005	McMeeking (2007)	FTSE 100 ^g	100		1.00									
2005	POB (2006)	Main market exc AIM	~1000 ^h		0.83									
2006	POB (2006)	Main market exc AIM	~1000 ^h		0.83									
2007	POB (2007)	Main market exc AIM	~1000 ^h		0.82									
2007	FRC (2007b)	FTSE 350	350	7	0.97									

^a USM was the Unlisted Securities Market; sample includes Irish companies.^b Index calculated for top 8 firms only.^c AIM is the Alternative Investment Market, secondary to the main market.^d Pro forma following Andersen's collapse, assuming all Andersen clients gained by Deloitte & Touche (the acquirer of Andersen UK).^e Includes only companies with audit fees available from FAME database (approx. 69% of population).^f Includes only those companies where auditor identity available from Datastream (approx. 89% of population, biased towards larger companies).^g A second sample that also included 80 additional listed companies was also considered.^h Approximate sample size inferred from Table 23 (pp. 58–61) of POB (2007).

empirical evidence to support the contention that competition in the audit service market has been impaired, similar to the earlier studies such as Dopuch and Simunic (1980) and Danos and Eichenseher (1986).

2.6. Consequences of Andersen's demise

Many studies have investigated the impact of Andersen's demise on issues other than concentration, in particular, auditor selection decisions and audit pricing. In an analytical paper, Schloetzer (2006) analyses a Cournot model of oligopoly to explore the impact of Andersen's break-up. The model predicts that the number of audits completed by the remaining Big 4 audit firms will decline, due to short-run capacity constraints, creating an increase in switching to non-Big 4 firms. He reports evidence consistent with this prediction. Empirical studies of audit pricing following Andersen's demise mostly relate to the US market. Chi (2006), using US data, finds that audit fees across all companies have generally risen following the Andersen event. However, the phenomenon of initial fee discounting is apparent, and among Big 4 clients is statistically greater for former Andersen clients than for non-former Andersen clients. Asthana, Balsam and Kim (2009) report that audit fees and the audit fee rate (as a percentage of total assets) of US companies rose markedly in 2002 following the Enron scandal, especially for larger, riskier clients. However, they find that former Andersen clients actually pay lower audit fees in 2002 compared to continuing clients of the Big 4 firms, which is evidence consistent with a competitive market for former Andersen clients. Kealey, Lee and Stein (2007) examine, for a sample of 547 US companies, the impact of audit firm tenure on the level of audit fees paid to Andersen's successor auditors. The observed positive relationship is attributed to the perceived higher level of client risk associated with longer tenure. The change in audit fees arising from the change in auditor is not, however, explored. Kohlbeck, Mayhew, Murphy, and Wilkins (2008) report that clients who followed their Andersen audit team paid about the same as in the previous year (i.e., they neither received a 'low-balling' discount nor paid a premium). Those that did not follow the Andersen audit team but moved to another Big 4 auditor paid a premium fee while companies hiring a non-Big 4 audit firm obtained a discounted audit fee, broadly similar in size to the amount of low-balling discount in non-Andersen audit

changes. Similarly, Vermeer, Rama and Raghunandan (2008) find that ‘follower’ clients paid 16% lower audit fees than non-followers. More generally, Huang, Raghunandan and Rama (2009) and Ghosh and Pawlewicz (2009) find that, in the post-SOX era, Big 4 clients no longer receive an initial audit fee discount.

Outside the US, where the reputational effect of Andersen’s demise may have been less pronounced, evidence is limited. Hamilton, Li and Stokes (2008), using Australian data, conclude that overall the market remained competitive following Andersen’s break-up. However, they find higher premiums generally for Big 4 audits post-Andersen and the audit fee data reported for former Andersen clients show an above-inflation rise in aggregate audit fees of 9.8% (derived from Table 1, panel B), though these are not adjusted for the apparent changes (reductions) in auditee size; aggregate NAS for former Andersen clients declined by 1%. The only UK study to date is an unpublished study by Basioudis and Papadimitriou (2007), who find no change in inflation-adjusted audit fees between 2001 and 2002 for former Andersen clients (the unadjusted increase is 10%). Their analysis, however, is based on a restricted sample of only 63 companies. Thus, the available evidence in relation to the pricing effect of Andersen’s demise is conflicting.

Researchers have noted that standard, single period cross-sectional audit fee models do not address ‘the dynamics of changes in audit fees’ and that call for further research on this important issue (Clatworthy and Peel, 2007, p. 198). The Andersen failure offers a quasi-experimental setting in which the factors impacting changes in audit fees can be observed.¹⁸

3. Methods

The audit market examined in the present study concerns the auditors of all domestic UK companies listed on both the main and AIM markets of the London Stock Exchange (LSE) for the period 1998 through 2003. Information about companies, their auditors and FTSE industry classification was extracted from the Waterlow Stock Exchange Yearbook (SEYB).¹⁹ Accounting data (sales, total assets and audit fees) were mainly sourced from Datastream with recourse to FAME and annual reports to fill in missing data. These data requirements reduced the sample size and led to the exclusion of investment trust companies, in particular. For companies identified as having changed auditors, audit firm details were cross-checked against annual reports or, in the few situations where these were not available, against data in FAME.

Changes in the audit market can be caused by the entry and exit of companies to and from the stock exchange. Information about newly listed companies, re-admission and new issues was obtained from the ‘Primary market fact sheet’ published by the LSE. Information about delisted companies was sourced from Hemscott, Datastream and Citytext. Audit firm mergers in the 1998–2003 period were identified from Boys (2003) and individual audit firms’ web pages.

Three measures of market concentration have been applied previously in audit market studies. The two widely used measures are the *k*-firm concentration ratio (CR) and the Hirschman–Herfindahl index (HI) – see Pong (1999, p. 455) for a description of these measures. The third measure, the Gini Coefficient, though used in many economic related studies to measure inequality in wealth, is relatively new to audit market studies. It captures the inequality between market participants (see Quick and Wolz, 1999 for a description and application of this measure). All three measures provide an indication of market concentration for the aggregate audit market. To obtain more information about the dominance of individual participating firms, the calculation of individual audit firms’ market share is required.

Four different measures of market share have been used to date. The number of audits is perhaps the most commonly used measure; it is intuitive, facilitates reconciliation with changes in the population of consumers and auditor switches and its calculation requires knowledge only of the identity of the auditor. However, the existence of an audit is a poor measure of activity level and so, in settings where audit fees are disclosed, audit fees are used as the measure of choice. Concentration measures based on number of audits, while highly correlated with measures based on audit fees, are known to be systematically lower due to the ‘size effect’, whereby large companies tend to employ large audit firms. In settings where audit fees are not disclosed, inferior measures of total assets or total sales are used to proxy activity level; in the present study, the preferred measure of audit fees is used.

4. Results and discussion

4.1. Descriptive statistics

Table 2 provides descriptive statistics for the six-year period. The number of companies decreased from 1607 in 1998 to 1386 in 2003, with the number of audit firms decreasing from 85 to 72.²⁰ To put this trend into context, in 1968 there were 1109 audit firms active in the public listed market (Briston and Kedsle, 1985). Further, the 72 ‘active’ audit firms represent a tiny proportion of the nearly 20,000 accounting firms in the UK (International Financial Services, 2003). The small number of ‘active’ audit firms suggests significant barriers to entry in the public listed company audit market. It may be noted that a similar number of ‘active’ firms (85) audit the much larger US market (7006 public companies) (WHO Audits America, 2003).

¹⁸ The passage of the Sarbanes–Oxley Act would not have affected audit fees until 2004, the year that Section 404 became effective (Schloetzer, 2006, p. 11), and so is not a confounding effect in the analysis of audit fee changes in 2002–03.

¹⁹ Previously known as the Macmillan Stock Exchange Yearbook.

²⁰ These figures will not have been affected by the increase in the audit exemption threshold which came into effect for year-ends on or after 30th March 2004 (see <http://www.companieshouse.gov.uk/infoAndGuide/faq/auditThresholds.shtml>).

Table 2

Descriptive statistics: UK domestic listed companies.

	1998	1999	2000	2001	2002	2003	1998–2003 change (%)
Sample size	1607	1498	1479	1539	1497	1386	11.0
Number of auditors	85	80	74	78	77	72	
Retail Price Index (RPI)	163.4	165.6	171.1	174.4	176.2	181.3	
RPI change (%)	–	+1.4	+3.3	+1.9	+1.0	+2.9	
<i>Total assets (£m)</i>							
Mean	1519	1884	2150	2230	2383	2673	76.0
Mean change (%)	–	+24	+14	+4	+7	+12	
Median	53	58	57	50	45	48	–9.9
Median change (%)	–	+9	–2	–12	–11	+7	
Minimum	0.106	0.045	0.174	0.006	0.003	0.006	
Maximum	219,500	254,800	316,200	358,534	403,100	455,275	
<i>Sales (£m)</i>							
Mean	526	580	634	636	657	731	39.0
Mean change (%)	–	+10	+9	0	+3	+11	
Median	52	53	45	40	35	41	–20.4
Median change (%)	–	+1	–14	–12	–11	+17	
Minimum ^a	0	0	0	0	0	0	
Maximum	33,340	37,017	51,503	49,254	60,826	49,039	
<i>Audit fees (£000)</i>							
Mean	252	268	268	270	301	339	34.5
Mean change (%)	–	+6	0	+1	+11	+13	
Median	68	70	69	68	71	75	10.3
Median change (%)	–	+3	–1	–1	+4	+6	
Minimum	2	3	2	2	3	1	
Maximum	14,431	14,172	16,926	13,892	15,901	17,920	
<i>Audit fees per £000 total assets</i>							
Aggregate ^b	0.166	0.142	0.125	0.121	0.126	0.127	–23.5
Mean ^c	2.05	2.19	1.98	2.53	3.35	3.66	78.5
Mean change (%)	–	+7	–9	+28	+32	+9	
Median	1.38	1.36	1.25	1.38	1.60	1.63	18.4
Median change (%)	–	–2	–8	+10	+16	+2	
Minimum	0.011	0.006	0.007	0.008	0.009	0.008	
Maximum	191	222	46	1333	1333	829	
<i>Audit fees per £000 sales^d</i>							
Aggregate ^b	0.48	0.461	0.423	0.424	0.458	0.464	–3.3
Mean ^c	4.62	5.06	11.45	16.74	20.48	8.29	79.4
Mean change (%)	–	+10	+126	+46	+22	–60	
Median	1.33	1.32	1.54	1.77	1.89	1.80	35.3
Median change (%)	–	0	+17	+14	+7	–5	
Minimum	0.026	0.034	0.039	0.037	0.029	0.032	
Maximum	2571	2333	12,000	10,000	7000	10,000	

^a Several companies did not report any sales during the year.

^b Aggregate = (sum of all company audit fees)/(sum of all company total assets or sales).

^c To avoid gross distortion by outliers, the 1% trimmed mean (0.5% from top and bottom) is reported.

^d Companies without sales were excluded from analysis.

The mean values for both values of auditee company size (total assets and sales) increased by considerably more than inflation over the period (see RPI change in Table 2, row 4). However, the median values of total assets and sales, which are not influenced by outliers, fell by 10% and 20%, respectively. Jointly, this reflects an increase in the numbers of both large and very small companies since 1998. A comparison of the size distributions (based on total assets) in 1998 and 2003 shows that the proportion of companies with assets above £500 million increased from 16% to 20%, and the proportion below £30 million from 37% to 42%.

Over the six-year period, mean (median) audit fees rose by 35% (10%) compared with general price inflation of 11%. This may reflect high increases in audit fees for large companies and/or the higher proportion of large companies in the population already identified. To explore whether the increase in audit fees merely reflects an increase in client size, the rate of audit fees per unit of size is reported (see last two panels in Table 2). In terms of *aggregate* audit fee charged related to total assets, the rate fell from 1998 to a low in 2001 then picked up in 2002; the trend based on sales was broadly similar. The mean and median values of *individual* fee rates (scaled by total assets) show increases in audit fee rate in 2001 and 2002.²¹ By contrast, both mean and median audit fee rates based on sales started to increase earlier (in 2000) and showed a decrease by 2003.

²¹ To avoid gross distortion caused by extreme values, the 1% trimmed mean is reported.

One plausible explanation for the mid-period increase is the regulatory and public response to Andersen's misconduct. Following the downfall of Andersen and the subsequent public concern about audit quality, companies had a smaller number of large auditors to choose from, so the remaining audit firms had greater market power. The early increase in audit fee rates in 2001 can perhaps be linked to the auditing industry atmosphere during the period. As widely reported in the press, the Enron scandal began in 2000, with Enron filing for the largest Chapter 11 bankruptcy protection in U.S. history in 2001.

4.1.1. Audit fee rates (research question 1)

To further investigate how Andersen's demise and related events affected the cost of audits, audit fee rates (per £000 total assets) for each size decile of companies are analysed for each of the years 2001, 2002 and 2003 (see Table 3 and Fig. 1). The graph in Fig. 1 clearly shows that, as expected, due to fixed costs and audit scale economies, the audit fee rate decreases as company size increases. Comparison over time reveals that the mean (and median) audit fee rate increased between 2001 and 2003 for each decile of company size. However, as shown in Table 3, the smallest companies have experienced a major (and statistically significant) increase of 155% (53%) in mean (median) audit fee rates, in contrast to an increase of 13% (19%) for the largest companies.

Thus, there is evidence of significant upward pressure on audit fees since 2001 for smaller audit clients. However, attribution of causation is not straightforward and several possible explanations exist. First, the increase might reflect a genuine 'Andersen effect': either auditors have undertaken additional audit work (e.g. additional substantive audit evidence collection following the partial rejection of the risk-based audit techniques pioneered by KPMG in the 1990s (Power, 2007)) and passed on the increased costs to clients or, perhaps, they have taken advantage of their increased market power following the reduction to four top tier auditors. Second, smaller companies might be perceived to be more risky, resulting in a higher insurance component in the audit fee in the changed audit environment. Third, Big 4 auditors might have adopted a strategy of reducing their client portfolios through auditing fewer clients, retaining only those small company clients willing to pay a higher fee. Finally, the price rises might reflect a general economic improvement which enabled auditors to catch up on price increases delayed as a result of the 2001 UK downturn.

4.2. Aggregate audit market concentration (research question 2)

Table 4 reports the level of auditor concentration from 1998 to 2003 using two different measures of market share²² and three different measures of concentration (CR – rows 1–4; HI – row 5; and Gini – rows 6–7). Based on both market share measures, the CR4 concentration ratio increased over the six-year period, particularly in 2002 and 2003 with the transfer of a majority of Andersen clients to other Big 4 auditors (see later). However, the aggregate market share of the large top tier auditors (shown as CR (Big 5/4) in the table) generally increased by much less. A notable contradiction here is the CR (Big 5/4) market share based on number of audits, which fell every year in the period (a pattern not shared with the Australian market (Hamilton et al., 2008)); over the six-year period the decline from 76% to 68% was statistically significant at the 1% level. In other words, audit fee income for top tier auditors has risen while the number of auditees has fallen. This is consistent with the argument and evidence that the Big 5/4 auditors have shifted their client portfolio towards larger, less risky, clients (Jones and Raghunandan, 1998; Rama and Read, 2006; Hogan and Martin, 2009).²³ CR6 and CR20 have been relatively stable over the six-year period across both measures.

Focusing on the concentration statistics based on the preferred audit fee proxy (panel B), the level of audit market concentration in the UK during the 6 year period has remained very high. In 1998 the top tier firms (then Big 5) audited 95% of the market and by 2003 this had grown to 96% (now Big 4). The increases in CR4 and CR6 over the period are statistically significant at the 1% level (2-tail). Looking back to 1991,²⁴ the top tier (then Big 6) had a markedly lower market share of 89% (Pong, 1999).

The domination of the top tier firms clearly exceeds the economists' 60% tight oligopoly threshold (Shepherd, 1997). The UK domestic listed audit market was a tight oligopoly by any market share proxy during the period of the present study (and back to 1991 at least). The lowest CR (Big5/4) was 68% in 2003 (number of audits) but was consistently above 94% based on audit fees. Such high concentration levels facilitate the possibility of successful collusion, overt or tacit, between the top firms.

In contrast to the *k*-firm concentration ratio, the more comprehensive HI and Gini coefficients for the whole market suggest a slight net decline in audit market concentration over the six-year period. This contrasts with evidence from the US which finds concentration to have increased (Feldman, 2006). These contrasting outcomes can perhaps be attributed to the substantially smaller market share of Andersen in the UK compared to the US; based on audit fees for 2001, Andersen's market share was 8.8% in the UK (Pong and Burnett, 2006) and 15.9% in the US (Feldman, 2006). In the UK, the HI measure fell between 1998 and 2001 to 25.0 after which it began to rise slowly to 27.0 in 2003. The 2001 value is almost identical to the 24.8 reported by Pong and Burnett (2006) but the 25.8 for 2002 is slightly higher than the 23.0 which McMeeking et al. (2007)

²² Concentration based on two more market share measures, auditee total assets and auditee sales, were also calculated. As the overall patterns of concentration are similar to those based on audit fees, they are not reported here in the interests of brevity.

²³ The willingness of firms to drop risky clients is illustrated by Deloitte's resignation from Easier in 2004 (Accountancy Age, 2005a, 2005b).

²⁴ Pong (1999) is the first study to report audit market concentration for the full UK market based on audit fees. Although Moizer and Turley (1987) used audit fees, their sample was limited to FTSE500 companies.

Table 3

Effect of client size on audit fee rate.

	Size decile										
	Small										Large
	1	2	3	4	5	6	7	8	9	10	
Panel A: Mean audit fee per £000 total assets											
2001	10.74	4.40	3.05	2.02	1.87	1.34	1.21	0.81	0.50	0.29	
2002	17.07	4.77	3.48	2.23	2.22	1.67	1.22	0.89	0.54	0.31	
2003	27.42	5.25	3.51	2.54	2.26	1.67	1.28	0.97	0.57	0.33	
2003 vs. 2001 <i>t</i> -stat ^a	2.91***	1.98**	1.45	2.96***	1.92	2.28**	0.64	1.85	1.43	1.37	
Panel B: Median audit fee per £000 total assets											
2001	6.70	3.51	2.54	1.70	1.50	1.12	0.97	0.62	0.40	0.21	
2002	8.46	4.19	2.79	1.78	1.78	1.23	1.01	0.76	0.40	0.22	
2003	10.31	4.52	2.84	2.14	1.86	1.33	1.10	0.80	0.47	0.25	
2003 vs. 2001 <i>z</i> -stat ^{a,b}	5.59***	2.38**	1.69	2.82***	1.57	2.25**	0.73	1.71	1.84	1.87	

^a ***p* < 5%, ****p* < 1% (2-tail).^b Wilcoxon Mann–Whitney test.

report, based on their smaller sample. The Gini coefficient for the whole market (penultimate row in each panel) declined slightly to 2000 and then remained broadly stable.

In the US, the Department of Justice and the Federal Trade Commission classify the HI into three regions with a value below 10 characterising an unconcentrated market, a value between 10 to 18 characterising a moderately concentrated market and a value above 18 characterising a highly concentrated market (GAO, 2003). The present study reports an HI (based on number of audits) ranging between 12 and 14 (signalling moderate concentration). However, HI based on audit fees ranged between 25 and 28, signalling a highly concentrated audit market with potential for significant market power.

The Gini (whole market) coefficient remained very high throughout the entire period suggesting considerable inequality of market share across auditor participants. However, while the Andersen demise had little impact on the overall picture, it has markedly reduced the level of inequality between the top tier firms. Looking back to 1991 and 1995, the Gini coefficients

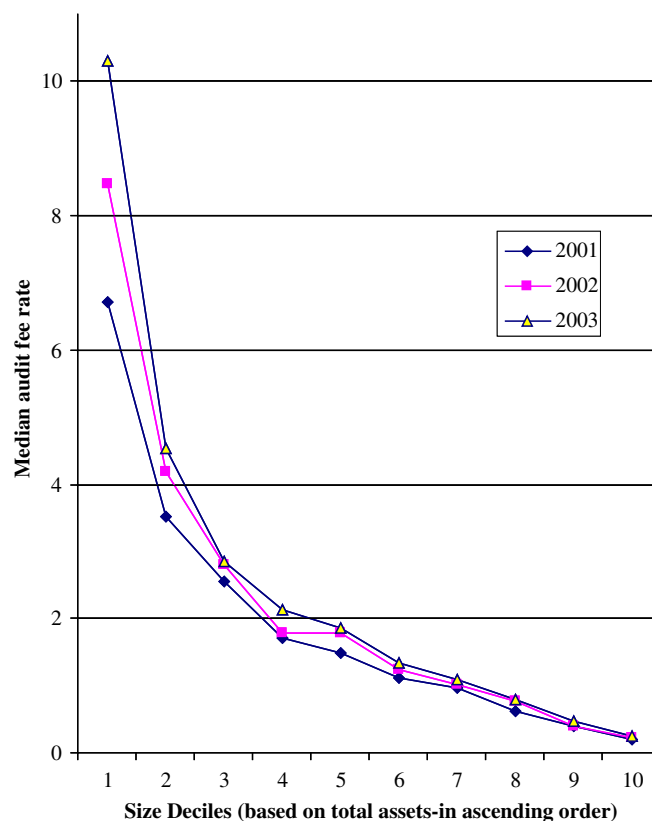


Fig. 1. Effects of client size on audit fee rate. ote: 1. Audit fee rate = £audit fee per £000 total assets audited.

Table 4
Auditor concentration in the UK domestic listed company market: 1998–2003.

	1998	1999	2000	2001	2002	2003	1998 vs. 2003 z-stat ^b
Panel A: Based on number of audits							
CR4	67.02	65.69	63.62	61.99	66.40	68.47	0.85
CR (Big 5/4) ^a	75.86	75.30	72.95	70.63	68.80	68.47	−4.51***
CR6	80.46	80.57	78.43	76.93	78.96	80.66	0.14
CR20	94.65	95.79	95.54	95.39	95.12	94.81	0.20
HI	14.36	13.81	12.78	12.13	12.63	13.32	
Gini (whole market)	87.88	87.50	86.50	86.48	86.12	86.19	
Gini (Big 5/4) ^a	29.89	19.25	24.00	23.69	32.00	14.72	
Panel B: Based on audit fees							
CR4	87.85	87.95	86.44	87.86	93.53	95.94	7.95***
CR (Big 5/4) ^a	94.94	95.29	94.68	94.66	95.06	95.94	1.30
CR6	96.00	96.56	96.15	96.16	96.41	97.85	2.89***
CR20	99.20	99.31	99.30	99.36	99.44	99.57	1.29
HI	27.80	26.64	25.28	25.02	25.80	27.04	
Gini (whole market)	96.09	95.88	95.33	95.65	95.95	96.06	
Gini (Big 5/4) ^a	47.88	44.17	41.09	42.13	46.00	29.73	

^a Big 5 up to 2002. Most Andersen clients (97 companies) changed auditor in 2002, however, there were 36 companies' still audited by Andersen in 2002. These companies were treated as Andersen clients until publication of the next annual report in 2003.

^b Standard test of difference between proportions; *** $p < 1\%$ (2-tail). Equivalent tests for HI and Gini unavailable.

for top tier (then Big 6) market share based on audit fees were 29 and 30, respectively.²⁵ The final row in panel B reports the Gini (Big 5/4) coefficient for the study period. In 1998, the coefficient had risen to 48 (for the Big 5) but the impact of the redistribution of former Andersen clients reduced this to 30 (for the Big 4) by 2003.²⁶ Thus, the equality of audit market share for the four top tier firms has now returned to the level it was at prior to the Price Waterhouse/Coopers & Lybrand merger. This is explored further in the next section.

4.3. Individual firm market share at market level (research question 3)

Given the current interest in auditor choice and the viability of a challenge to the Big 4 by mid-tier firms (FRC, 2007b), analysis is also undertaken at the individual audit firm level (for the top tier and six leading mid tier firms). Several observations can be made from the detailed analysis of market shares by individual firm shown in Table 5. Based on audit fee ranking, PwC was the market leader with total market share of about 40%, a level that industrial organisation theorists cite as the cut-off level to identify the existence of a 'dominant firm' (Beattie et al., 2003). It is interesting to note that the PwC market share was always markedly higher than that of the number two firm throughout the period. KPMG, the nearest rival, held only 23–26% of the market share. According to Shepherd (1997), a dominant firm usually has two effects on prices similar to those of pure monopoly. First, they raise the level of their prices, often (though not always) gaining excess profits. Second, they engage in price discrimination.

Over the full 1998–2003 period, the market share of PwC and KPMG declined slightly (both number of audits and audit fees) while that of Ernst & Young declined based on number of audits but increased a little based on audit fees. Following its acquisition of Andersen, Deloitte gained considerably both in terms of audit fees and number of audits during 2002 and 2003. Interestingly, these gains continued an upward trend that started much earlier than Andersen's demise and saw its market share almost double (number of audits) with a larger increase based on audit fees. Overall, the Big 4 are now more closely aligned in terms of audit market share as indicated by the Gini coefficients discussed in the previous section.

By contrast, the audit fee market share gap between the Big 4 and other smaller firms has become wider over the six-year period. This is clearly demonstrated by comparing the market shares of Ernst & Young, the smallest of the Big 4, and of the non-Big 4 auditors. Based on audit fees, E&Y had 13% market share in 2003, which was more than three times as large as the entire non-Big 4 market share (4%). BDO Stoy Hayward, the closest rival to the Big 4, held just above 1% market share, indicating its very weak position relative to the Big 4. It is worth noting, however, that the mid-tier consolidation merger between Grant Thornton and Robson Rhodes in the summer of 2007 serves to narrow the gap slightly.

4.4. Changes in Big 5/4 market dominance (research question 4)

To examine the underlying factors that have contributed to changes in concentration, a decomposition analysis of the aggregate Big 5/4 concentration ratio changes over the 1998 to 2003 period is presented in Table 6. The impact of four distinct

²⁵ These were calculated using data taken from Pong (1999, Table 3, p. 461).

²⁶ The temporary rise in the Gini coefficient to 46 for 2002 reflects the fact that a relatively small number of clients continued to be audited by Andersen, giving the firm a small market share and leading to a wider inequality of market shares between the 5 top tier auditors. A broadly similar pattern of reduction in top tier inequality by 2003 is indicated in Panel A of Table 4, where the Gini coefficient is based on number of audits. However, the smaller Gini coefficients (e.g. 15 for 2003) imply a much lower level of inequality between the Big 4; i.e. the number of companies that each firm audits is quite similar.

Table 5
Auditor market share (rank) by individual firm.

	Market share (rank) based on											
	No. of audits						Audit fees					
	1998 %	1999 %	2000 %	2001 %	2002 %	2003 %	1998 %	1999 %	2000 %	2001 %	2002 %	2003 %
PwC	26.32 (1)	24.97 (1)	22.45 (1)	21.44 (1)	20.57 (1)	20.85 (1)	43.43 (1)	42.71 (1)	40.57 (1)	39.23 (1)	37.72 (1)	40.01 (1)
KPMG	19.91 (2)	19.49 (2)	19.41 (2)	18.45 (2)	18.50 (2)	18.47 (2)	25.62 (2)	23.16 (2)	23.81 (2)	25.18 (2)	26.12 (2)	23.57 (2)
Deloitte & Touche	9.52 (4)	10.61 (3)	10.62 (4)	11.50 (3)	16.50 (3)	18.33 (3)	7.09 (5)	9.72 (4)	11.39 (3)	13.18 (3)	18.62 (3)	19.53 (3)
Ernst & Young	11.26 (3)	10.61 (3)	11.16 (3)	10.59 (4)	10.82 (4)	10.82 (4)	11.44 (3)	12.36 (3)	10.67 (4)	10.28 (4)	11.06 (4)	12.83 (4)
Andersen	8.84 (5)	9.61 (5)	9.33 (5)	8.64 (5)	2.40 (8)	- -	7.37 (4)	7.34 (5)	8.24 (5)	6.80 (5)	1.53 (5)	- -
Total Big 5/4	75.86	75.30	72.95	70.63	68.80	68.47	94.94	95.29	94.68	94.66	95.06	95.94
BDO Stoy Hayward	4.60 (6)	5.27 (6)	5.34 (7)	6.24 (7)	6.08 (6)	5.84 (6)	1.06 (6)	1.28 (6)	1.47 (6)	1.50 (6)	1.35 (6)	1.02 (5)
Grant Thornton	4.48 (7)	4.61 (7)	5.48 (6)	6.30 (6)	6.48 (5)	6.35 (5)	0.88 (7)	0.88 (7)	1.13 (7)	1.22 (7)	1.12 (7)	0.90 (6)
Baker Tilly	1.00 (11)	1.13 (11)	1.69 (10)	1.56 (11)	3.61 (7)	4.18 (7)	0.18 (12)	0.18 (11)	0.23 (11)	0.20 (12)	0.49 (8)	0.53 (7)
Robson Rhodes	1.31 (9)	1.54 (9)	1.49 (11)	1.62 (10)	1.74 (9)	1.80 (9)	0.36 (10)	0.33 (8)	0.34 (8)	0.32 (9)	0.32 (9)	0.26 (8)
Pannell Kerr Forster	1.49 (8)	1.60 (8)	1.83 (8)	1.88 (8)	1.67 (10)	2.02 (8)	0.36 (9)	0.28 (9)	0.32 (9)	0.33 (8)	0.25 (11)	0.21 (9)
Moore Stephens	0.75 (13)	0.80 (12)	0.74 (13)	0.78 (13)	1.07 (11)	1.08 (10)	0.37 (8)	0.26 (10)	0.27 (10)	0.23 (11)	0.29 (10)	0.19 (10)
Others	10.52	9.75	10.48	10.98	10.55	10.25	1.84	1.51	1.56	1.54	1.12	0.96
Total Non-Big 5/4	24.14	24.70	27.05	29.37	31.20	31.53	5.06	4.71	5.32	5.34	4.94	4.06
Total	100	100	100	100	100	100	100	100	100	100	100	100
Total audit fees (£m)							405	401	397	415	450	470
Number of companies	1607	1498	1479	1539	1497	1386						

Note: Ordered on 2003 audit fee market share.

Table 6
Analysis of Big 5/4 concentration movement: 1998–2003.

Panel A: Based on number of audits			
	All UK	Non- Big 5/4 Number of audits (% of all UK)	Big 5/4 Number of audits (% of all UK)
Number of audits in 1998	1607	388 (24.1)	1219 (75.9)
Leavers listed in 1998	(643)	(160) (24.9)	(483) (75.1)
Continuing companies	964	228 (23.7)	736 (76.3)
Companies joining LSE 1999-2003	541	262 (48.4)	279 (51.6)
Leavers who joined after 1998	(119)	(57) (47.9)	(62) (52.1)
Net joiners	422	205 (48.6)	217 (51.4)
	1386	433 (31.2)	953 (68.8)
Non-par switches:			
Auditor change <i>to</i> Big 5/4 1999-2003		(99)	99
Auditor change <i>from</i> Big 5/4 1999-2003		103	(103)
		4	(4)
Number of audits in 2003	1386	437 (31.5)	949 (68.5)
Panel B: Based on audit fees (£000)			
	All UK	Non- Big 5/4 Total audit fee (% of all UK)	Big 5/4 Total audit fee (% of all UK)
Audit fees in 1998	405,211	20,514 (5.1)	384,697 (94.9)
Leavers listed in 1998	(116,897)	(10,154) (8.7)	(106,743) (91.3)
Continuing companies' audit fees at 1998	288,314	10,360 (3.6)	277,654 (96.3)
Continuing companies' audit fee changes	134,821	7,158 (5.3)	127,663 (94.7)
Continuing companies' audit fees at 2003	423,135	17,518 (4.1)	405,317 (95.8)
Companies joining LSE 1999-2003	55,030	6,319 (11.5)	48,711 (88.5)
Leavers who joined after 1998	(8,015)	(1,957) (24.4)	(6,058) (75.6)
Net joiners	47,015	4,362 (9.3)	42,653 (90.7)
	470,150	21,880 (4.7)	447,970 (95.3)
Non-par switches:			
Auditor change <i>to</i> Big 5/4 1999-2003		(9,357)	9,357
Auditor change <i>from</i> Big 5/4 1999-2003		6,532	(6,532)
		(2,825)	2,825
Audit fees in 2003	470,150	19,055 (4.1)	451,095 (95.9)

Notes: 1. The number (£000) of auditor changes *to* Big 5/4 is as follows: 1999 = 26 (2,423); 2000 = 22 (1,409); 2001 = 18 (1,934); 2002 = 21 (1,795); 2003 = 12 (1,796).
2. The number (£000) of auditor changes *from* Big 5/4 is as follows: 1999 = 17 (906); 2000 = 9 (1,149); 2001 = 23 (1,128); 2002 = 33 (1,603); 2003 = 21 (1,746).

consumer-based reasons for change is calculated: leavers; net joiners; non-par auditor switches; and (in the case of audit fees measure only) audit fee changes. Panels A and B focus on number of audits and audit fees, respectively. Leaver companies include those that were acquired, failed, went private or left the market for any other reason. The analysis of joiners recognises that some joiners may have left the market by 2003. The analysis of switchers focuses on non-par auditor changes (i.e., those involving a change in audit firm tier). In total, there were 464 switches, representing 5.8% per annum using the number of audits in 1998 (1607) as the baseline; of these, almost half (202) were non-par changes.

Panel A shows an overall reduction in Big 5/4 market share of 7.4% (from 75.9% to 68.5%) based on *number of audits*. The Big 5/4 audited about 75% of the leaver companies that were listed in 1998, closely in line with their overall market share in 1998. However, they had a much smaller market share (51%) of companies joining the market since 1998, which accounts for the overall reduction in the Big 5/4 market share based on number of audits. The impact of non-par switches between Big 5/4 and other auditing firms was broadly neutral, with the Big 5/4 showing a small net loss of 4 audits.

The analysis of market share based on *audit fees* (Panel B) shows differences in the scale and overall impact of factors. The Big 5/4 market share shows an overall *increase* between 1998 and 2003 of 1.0% (from 94.9% to 95.9%). The Big 5/4's lower market share of leavers (91%) implies a higher market share of continuing companies, up 1.4% from 94.9% to 96.3%. This represents the largest cause of the overall change in concentration. The change in continuing clients' audit fees had a small negative impact on concentration (decline of 0.5%). While the Big 5/4 audited just over half of joiners, these tended to be the larger joining companies so the audit fees represented 88% of the total for joiners. Of these joiners, 62 had left the market by 2003 and the Big 5/4 share of their audit fees was 76%. Together, this left the Big 5/4 with 91% market share of joiner audit fees. However, as this was below their overall 1998 market share, the impact was to reduce slightly their market share, contributing a reduction of 0.5% in concentration. While there was a very small net loss of audits by Big 5/4 to others, the Big 5/4 actually achieved a net gain in audit fees from voluntary auditor change of £2.8 million; this led to a small rise (0.6%) in audit fee market share.

In summary, since 1998 the Big 5/4 have a smaller number of audits (279 fewer), primarily because they audit a smaller number of new entrants to the market. However, they have managed to increase audit fees (by £66 million) and their share of audit fees, as a result of two main factors. First, the Big 5/4 have retained a larger share of audit fees for companies that have

remained in the market. This is consistent with the retention of Big 5/4 auditors by companies that have grown either organically or by acquisition. Second, they tended to gain larger companies as clients as a result of switches. This may reflect a Big 5/4 strategy of avoiding audits which they perceive to be high-risk, as evidenced in the US (Jones and Raghunandan, 1998; Rama and Read, 2006).

4.5. Industry concentration (research question 5)

Beattie et al. (2003) showed that in 2002 the Big 5 audited the entire FTSE 100 companies and almost 98% of the FTSE 250 companies.²⁷ Apart from auditor reputation, it has been argued that an auditor's technical capability in specific industry sectors is the main factor that causes large companies to choose a top tier auditor (Neal and Riley, 2004; Ferguson, Francis & Stokes, 2006; Knechel, Naiker & Pacheco, 2007). This industry-specific technical capability can be achieved by specialisation, at both the national and city level (Ferguson et al., 2006; Basioudis and Francis, 2007).²⁸ Table 7 presents auditor market share (based on audit fees) in industry sectors for 2003. This shows that one of the Big 4 firms was the market leader in every one of the 34 industry sectors. PwC was the leader in 18 industries, KPMG was the leader in eight, while Deloitte and Ernst & Young were both leaders in four industries.

There is no consensus on the level of market share that indicates industry specialism. Prior studies have used various levels of market share including 10% and 20% (Craswell, Francis & Taylor, 1995), 30% (Knechel et al., 2007) and more recently 50% (Beattie et al., 2003). Table 7 identifies the market leader in each sector (underlined) as well as the auditors in the 20 sectors where a market share of at least 50% is held (in bold). From the table, the leading position of PwC among the Big 4 is clear (see summary at bottom of table). PwC audits the entire tobacco sector (3 companies) and has more than 90% market share in the oil and gas (31 companies) and steel and other metals (4 companies) sectors. Overall, PwC is the market leader in 18 sectors and has at least 50% market share in 11 sectors. By comparison KPMG, Deloitte and Ernst & Young have at least 50% market share in only six, one and two sectors, respectively. In the UK in 2003, the average market share of the industry leader (across 29 non-financial sectors) was 58%, with the second ranking firm having 22%.²⁹

Focussing on the relatively large sectors (by number of companies), 17 contain 30 or more companies (Craswell et al., 1995). PwC was market leader in 10 of these large sectors. Just five sectors had a market leader auditor with at least 50% market share (PwC for 4 sectors and Ernst & Young for 1). Based on market capitalisation, there were 13 sectors larger than £50 billion. However, only PwC and KPMG had more than 50% market share in those sectors (PwC for 3 sectors and KPMG for 3). PwC was the market leader in six sectors, while KPMG, Deloitte and Ernst & Young were the leaders in four, two and one sector, respectively.

In aggregate, the Big 4 clearly dominated all sectors, with their lowest market share being 87% (in Housing Goods & Textiles, a sector with a large number of small companies). The Big 4 has complete dominance in four sectors: Forestry & Paper, Tobacco, Banks and Life Assurance. The dominance of one or two Big 4 auditors in a significant number of sectors is likely to be of concern to companies desiring an industry-specialist auditor. It implies that their choice is severely restricted, especially if they wish to avoid the auditor of a competitor. Further, while most of the sectors dominated by a single Big 4 auditor (>50% market share) are relatively small in terms of the number of companies (26% of the 1386 companies are in such sectors), they represent a significant part of the market with 52% of market capitalisation.

In eleven sectors, however, one or more mid-tier firms did claim a significant presence ($\geq 2\%$ audit fees) and in 9 sectors a mid-tier firm's market share exceeded that of one of the B4 firms. There were only two mid-tier firm sector market shares in excess of 5% - BDO Stoy Hayward held 7.8% in General Retailers and Grant Thornton held 7.3% in Electronic & Electrical Equipment. But, in two further sectors, 'other' smaller non-Big 4 auditors (i.e., firms not identified separately in the table) in aggregate held significant market shares - 6.9% in Housing Goods and Textiles and 5.9% in Diversified Industrials. These findings offer some hope that, if the recommendations of the FRC (2007b) audit choice study are put in place, mid-tier firms may, in the medium-term, represent viable alternatives to a B4 auditor.

4.6. Analysis of auditor choice and fees paid by former Andersen clients (research question 6)

In 2001, Andersen had 97 clients who changed auditor the following year, while in 2002 Andersen had 36 clients remaining (those with fiscal year ended before August). As the focus in this section is a pre/post comparison, eight companies that delisted in 2002 or 2003 were removed, leaving 125 former Andersen clients for analysis.

Table 8 provides a summary for former Andersen clients of the successor auditor (panel A) and, for each successor, aggregate audit fees, median audit fee rates pre and post change, aggregate NAS fees and aggregate total fees (panels B–E, respectively). Different rows of the table distinguish different key groupings of audit firms - in particular, the B4 excluding

²⁷ The FTSE 100 comprises the 100 largest companies (by market capitalisation) and the FTSE 250 comprises next largest 250 companies. Together they comprise the largest 350 UK listed companies and account for 74% of listed companies' total audit fees (Beattie et al., 2003).

²⁸ It has been shown that industry specialist auditors reduce earnings management attempts, indicating that they provide higher quality audits (e.g. Kwon, Lim & Tan, 2007).

²⁹ An interesting comparison is with the US market pre Andersen's demise. Based on 2000–01 audit fee data for 63 non-financial industries, Francis, Richelt and Wang (2005: p. 119) report that industry leaders had, on average, 50% of industry fees, with the second ranking firm having 22%.

Table 7
Auditor market share in 2003 (based on audit fees) by industry sector.

Sector	Mkt Cap (£bn)	No. of Cos	PwC %	KPMG %	DT %	EY %	Big 4 %	BDO %	GT %	BT %	RR %	PKF %	MS %	Top-10 %	Others %
<i>Resources</i>															
Mining	57,258	31	19.4	30.1	<u>36.4</u>	11.9	97.7	0.0	1.3	0.1	0.0	0.4	0.2	99.8	0.2
Oil and gas	243,152	31	92.0	0.1	<u>1.6</u>	5.0	98.7	0.5	0.1	0.1	0.4	0.0	0.0	99.7	0.3
<i>Basic industries</i>															
Chemicals	19,110	20	42.6	50.6	4.4	0.8	98.4	0.5	0.3	0.0	0.0	0.2	0.0	99.3	0.7
Construction and building material	37,924	71	<u>32.5</u>	<u>31.4</u>	16.2	15.2	95.2	0.2	0.8	0.2	0.8	0.0	0.5	97.7	2.3
Forestry and paper	1563	3	<u>4.9</u>	95.1	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Steel and other metals	3158	4	94.6	<u>1.4</u>	3.6	0.0	99.6	0.0	0.0	0.0	0.0	0.0	0.0	99.6	0.4
<i>General industrials</i>															
Aerospace and defence	71,062	13	34.8	53.0	9.6	2.1	99.6	0.0	0.0	0.0	0.0	0.0	0.0	99.6	0.4
Diversified industrials	197,192	4	15.3	78.8	0.0	0.0	94.1	0.0	0.0	0.0	0.0	0.0	0.0	94.1	5.9
Elect. and Electrical equipments	13,478	46	5.1	<u>10.6</u>	19.1	<u>53.6</u>	88.4	1.1	7.3	0.6	0.5	0.3	0.0	98.2	1.8
Engineering and machinery	32,952	64	18.0	<u>37.3</u>	25.4	<u>15.2</u>	95.8	1.2	0.3	0.0	0.3	0.0	0.9	98.5	1.5
<i>Cyclical</i>															
Automobiles	41,041	20	<u>77.3</u>	10.6	4.7	2.5	95.1	1.3	3.2	0.3	0.1	0.0	0.0	100.0	0.0
Housing goods and textiles	4297	52	<u>54.1</u>	18.4	10.3	4.4	87.2	0.2	2.7	1.1	1.6	0.4	0.0	93.1	6.9
<i>Non-cyclical</i>															
Beverages	64,621	9	27.3	60.9	0.0	10.4	98.7	0.0	0.4	0.7	0.0	0.0	0.0	99.9	0.1
Food prod. and process.	43,481	30	57.1	17.2	21.6	2.7	98.5	0.2	0.2	0.1	0.0	0.5	0.0	99.6	0.4
Health	34,224	41	<u>45.0</u>	18.5	27.0	4.1	94.6	0.0	1.0	1.3	2.2	0.2	0.0	99.2	0.8
Person. Care & House.	15,526	3	<u>0.0</u>	14.0	81.9	0.0	95.9	0.0	0.0	0.0	0.0	0.0	0.0	95.9	4.1
Pharma. & Biotech.	187,309	38	62.6	28.8	<u>5.7</u>	0.5	97.5	0.6	1.2	0.3	0.3	0.0	0.0	100.0	0.0
Tobacco	94,614	3	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
<i>Cyclical Services</i>															
General Retailers	63,140	68	<u>49.0</u>	13.3	22.0	6.3	90.6	7.8	0.8	0.0	0.0	0.0	0.2	99.3	0.7
Leisure & Hotels	30,927	88	<u>20.3</u>	20.9	15.6	<u>32.0</u>	88.8	4.9	1.6	2.2	0.4	0.2	0.0	98.1	1.9
Media & Entertainment	62,865	99	35.7	6.1	<u>41.3</u>	<u>11.7</u>	94.8	0.7	1.1	2.2	0.0	0.4	0.0	99.3	0.7
Support Services	38,866	149	<u>36.2</u>	25.6	<u>17.1</u>	<u>16.7</u>	95.6	1.1	0.7	0.4	0.5	0.6	0.3	99.1	0.9
Transport	27,054	38	<u>31.9</u>	22.1	15.0	30.5	99.5	0.0	0.1	0.1	0.0	0.0	0.0	99.8	0.2
<i>Non-Cyclical Services</i>															
Food and drug retailers	33,453	16	66.3	17.6	0.0	12.0	95.9	2.7	0.0	0.6	0.0	0.0	0.0	99.2	0.8
Telecommunication services	163,225	19	<u>24.2</u>	<u>39.3</u>	35.2	0.8	99.5	0.0	0.0	0.0	0.0	0.2	0.0	99.7	0.3
<i>Utilities</i>															
Electricity	14,995	6	55.8	37.3	0.0	5.3	98.5	0.0	0.0	0.0	0.0	1.5	0.0	100.0	0.0
Utilities – other	31,251	10	86.8	0.8	5.8	5.8	99.2	0.0	0.0	0.0	0.0	0.0	0.0	99.2	0.8
<i>Financials</i>															
Banks	377,346	10	<u>42.6</u>	24.3	33.2	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Insurance	35,593	21	63.7	14.0	6.8	8.8	93.3	0.0	1.9	0.3	0.0	1.0	0.0	96.5	3.5
Life assurance	38,290	8	<u>10.3</u>	50.8	2.4	36.5	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Real estate	26,178	76	23.7	<u>24.7</u>	37.4	2.9	88.8	3.4	1.4	2.0	0.0	0.0	0.2	95.9	4.1
Speciality and Other Fin	54,951	125	28.1	11.5	<u>24.7</u>	<u>29.0</u>	93.2	1.5	1.2	0.3	0.3	0.2	1.1	97.8	2.2
<i>Info. Technology</i>															
IT hardware	6210	28	13.7	6.6	18.5	53.4	92.2	1.6	0.3	2.5	1.6	0.9	0.5	99.5	0.5
Soft. & Comp. services	71,410	142	<u>31.2</u>	20.4	25.4	<u>11.9</u>	88.8	3.3	3.0	2.2	0.8	0.3	0.4	98.9	1.1
<i>Summary</i>															
No. of sectors where: market share ≥ 50%			11	6	1	2	20								
Market leader			18	8	4	4	34								
≥ 50% & market leader			11	6	1	2	20								
Total cos. in 34 sectors			1386												

Market shares of 50% or greater are highlighted in bold; leaders are underlined.

PwC = PricewaterhouseCoopers; KPMG = KPMG; DT = Deloitte; EY = Ernst & Young; BDO = BDO Stoy Hayward; GT = Grant Thornton; BT = Baker Tilly; RR = Robson Rhodes; PKF = PKF; MS = Moore Stephens.

Deloitte, in addition to the B4 and non-B4. Panel A shows that Deloitte, Andersen's UK acquirer, captured 93 (74%) former Andersen clients; 21 (17%) companies moved to another Big 4 auditor and 11 (9%) chose non-Big 4 firms. The largest non-Big 4 beneficiaries were BDO Stoy Hayward and Robson Rhodes, both second tier firms with international operations. The percentage of companies that switched to another Big 4 was slightly higher in the UK than in the US. The GAO (2003) study reported that 86% of former Andersen clients chose another Big 4 auditor (including Deloitte) and 14% switched to a non-Big 4 auditor. In the US, the switch to other Big 4 firms was more uniform than in the UK: Ernst & Young (26%); KPMG (25%); Deloitte (20%); and PwC (15%). Of 1085 former Andersen US clients, the study reported that 717 (66%) companies switched to non-Deloitte Big 4 (compared to only 17% in the UK).

Table 8

Analysis of former Andersen clients – successor auditors, audit and NAS fees.

Successor ^a	Panel A		Panel B aggregate AUDIT fees (£000)			Panel C audit fees per £000 total assets			Panel D aggregate NAS fees (£000)			Panel E aggregate TOTAL fees (£000)		
	No. of Audits	%	AA	New Auditor	%Change	Median AA	Median new auditor	Median % Change ^d	AA	New auditor	% Change	AA	New Auditor	% Change
DT ^b	93	74.4	19,471	20,449	5.0	0.93	1.04	7.2	49,355	39,300	-20.4	68,826	59,749	-13.2
PWC	9	7.2	2711	2535	-6.5	1.08	1.34	-9.3	1418	2103	48.3	4129	4638	12.3
EY	6	4.8	3818	4264	11.7	0.87	0.86	6.3	3200	973	-69.6	7018	5237	-25.4
KPMG	6	4.8	1211	1062	-12.3	1.18	0.73	-23.9	2063	2544	23.3	3274	3606	10.1
B4 excl DT	21	16.8	7740	7861	1.6	0.99	0.94	-6.7	6681	5620	-15.9	14,421	13,481	-6.5
Median changes in fees across B4 excl DT ^c					0.0						0.0			1.2
All B4 ^c	114	91.2	27,211	28,310	4.0	0.95	0.99	3.0	56,036	44,920	-19.8	83,247	73,230	-12.0
Median change in fees across B4					0.0						-15.1			-1.9
All non-B4	11	8.8	366	322	-12.0	2.31	2.35	1.7	399	211	-47.1	765	533	-30.3
Median change in fees across non-B4 ^c					-10.0						0.0			-28.4
All former AA clients ^c	125	100	27,577	28,632	3.8	1.00	1.02	2.4	56,435	45,131	-20.0	84,012	73,763	-12.2
Median change in fees across AA-clients					0.0						-13.2			-3.9

^a AA = Andersen; DT = Deloitte Touche; PWC = PricewaterhouseCoopers; EY = Ernst & Young; KPMG = KPMG; non-B4 successor auditors are BDO Stoy Hayward (4); Robson Rhodes (3); Nexia Audit (2); Grant Thornton (1); and Wilkins Kennedy (1).

^b For DT, the median change in audit fees, NAS and total fees were 0.0%, -17.1% and -6.6% respectively.

^c This is the median across the 21, 114, 11, 125 former AA clients audited, respectively, by 'B4 excluding DT', B4, non-B4 and overall.

^d This is the median % change in audit fee rate across the group of new auditor clients rather than the change in median audit fee rate.

Andersen clients' global preference towards another Big 4 firm is not unexpected given the international reputation and capability of the Big 4. The figures in Table 8 give an indication of the redistribution of clients that might occur if there were to be a further reduction from a B4 to a B3 (a scenario considered by FRC, 2007b). In addition, the importance to such companies of restoring investor and other stakeholder confidence was high. For example, Chaney and Philipich (2002) provide evidence that many former Andersen clients had experienced negative market reaction when Andersen admitted to shredding Enron's documents.

Panel B reports aggregate audit fees. For new Big 4 auditors, aggregate audit fees rose by 4.0% in contrast to a decline of -12.0% for new non-Big 4 auditors; the median change in audit fees for new Big 4 auditors was 0.0% compared with -10.0% for non-Big 4. Across all clients, the change in aggregate audit fees was 3.8%, broadly in line with inflation, with a median audit fee change of 0.0%. Thus, in contrast with prior US and Australian research, there is no evidence of general above-inflation audit fee rises in the UK following Andersen's demise.

Similarly, there is no evidence of general fee discounting on initial audit engagement for former Andersen clients, in contrast with the evidence reported by Chi (2006) for the US. Ernst & Young gained the largest clients (based on total assets) and also achieved above-inflation audit fee increases of 11.7%, in aggregate. Not surprisingly, the non-Big 4 gains were typically smaller companies with smaller audit fees. The median decline in audit fee of -10.0% in respect of non-Big 4 successor auditors can be attributed to the loss of the Big 4 audit premium and/or more significant fee discounting on initial audit engagements by small auditors (as found in the US by Ghosh and Lustgarten, 2006 and Kohlbeck et al., 2008).

The overall 5.0% rise in audit fees for moves to Deloitte Touche, the acquirer of the Andersen UK business, is slightly above the rate of inflation. This is broadly consistent with the 'no change' result for clients who followed the Andersen audit team in the US (Kohlbeck et al., 2008). However, in contrast with their results, the aggregate audit fee increase for moves to other Big 4 auditors of 1.6% (median change of 0.0%) provides no evidence of a fee premium in the UK.

The audit fee rates (audit fees per £000 total assets) reported in Panel C seek to take client size changes over the year of change into account (albeit imperfectly). Medians are reported to reduce the impact of outliers, though the small sample size for non-Big 4 auditees and for individual Big 4 successors (except DT) still affects the stability of the median. However, the median percentage change in audit fee rate was 3.0% (1.7%) for Big 4 (non-Big 4) and 2.4% overall; all are positive but again broadly in line with inflation, confirming that the audit fee results are not driven by changes in client size.

Overall, the lack of clear evidence of real (i.e. above inflation) audit fee rises for Andersen clients is perhaps surprising. These clients had a smaller pool of (large) audit firms from which to choose (especially when specialisation and refusal to appoint competitors' auditors are considered), which creates a demand pressure. The clients were also in a relatively weak bargaining position given their need to rebuild confidence. It suggests that either there was still sufficient competition to negate oligopolistic excesses, or the Big 4 did not seek to extract excess profits, politically aware that their actions would be closely monitored.

Panel D reports the level of NAS provided by Andersen and by the successor auditor. It is interesting to consider whether the incentives to reduce NAS to counter a perceived lack of auditor independence are greater than the benefits of knowledge spillovers and/or of the cross-subsidisation of audit fees. Overall, it is clear that reported NAS fees (i.e. those provided by the

auditor) fell significantly in aggregate following Andersen's demise: for Big 4 successors by –20%, for non-Big 4 by –47% and overall by –20%; the median change in NAS was –13.2% overall and –17.1% for the major acquirer DT. Similarly, total fees (audit plus NAS) paid by auditees declined, by –12.2% overall (Panel E) with a median change of –3.9%. Thus, there is no general evidence of knowledge spillover effects or cross-subsidisation of the audit fee by NAS. The evidence is consistent with the notion that audit firms and their clients responded to publicly-expressed concerns that NAS provision has the potential to affect external perceptions of auditor independence.

However, the detail shows that two audit firms (PwC and KPMG) did generate higher NAS fees than Andersen from the clients it took over. PwC generated an additional £0.7 m NAS, also leading to an increase in total fees of £0.5 m; the equivalent increases for KPMG were £0.5 m (NAS) and £0.3 m (total fees). The median changes in NAS for the individual four B4 auditors were: KPMG +8.4%; PwC 0.0%; DT –17.1%; and EY –52.6%. While this suggests that both KPMG and PwC may have gained, possibly from cross-subsidisation of audit fees by NAS income, this needs cautious interpretation given the very small sample sizes. Further, given the major market share of PwC (Pong and Burnett, 2006), it is perhaps likely that PwC was already providing a higher level of consultancy services to Andersen-audited companies than other audit firms. Any consultancy provided by the successor auditor prior to its commencement as auditor would need to be reported in the financial statements as NAS, potentially with greater impact for PwC than other firms.

5. Summary and conclusions

This paper presents evidence on audit market concentration and audit fee rates in the UK domestic listed company market during a crucial period of structural market change (i.e., following the PricewaterhouseCoopers' merger and encompassing Andersen's demise, 1998–2003). Concentration is shown to have been consistently high throughout the period, characteristic of a 'tight oligopoly'. However, there is clear evidence that concentration has, in a number of respects, shown a declining trend over the six-year period, indicating that Andersen's demise has reduced the level of inequality between the top tier firms.

The main factor underlying the drop in Big 5/4 concentration *based on number of audits* was the relatively small number of audits gained from joiners. This finding implies that, if the mid-tier firms that dominate this market segment can retain these clients as they grow, then market concentration will decrease. The main factor underlying the slight increase in Big 5/4 concentration *based on audit fees* was the retention of Big 5/4 auditors by companies that have grown. A secondary factor was that they tended to gain larger companies as clients as a result of switches. This may reflect investor and client preferences for a top tier auditor as companies grow, or a Big 5/4 strategy of avoiding the smaller (and therefore higher-risk) companies (Jones and Raghunandan, 1998; Rama and Read, 2006). The rate of auditor change over the period (5.8% p.a.), was higher than reported in prior UK studies (4.1% p.a. in Beattie and Fearnley, 1994; 4.5% p.a. in Pong, 1999). This could reflect increased competition brought about, in particular, by increased audit committees activity in relation to auditor selection and appointment during this period (due to regulatory pronouncements in relation to corporate governance such as the Hampel Report, 1998 and the Smith Committee, 2003 guidance).

Extant evidence from Australia and the UK indicates that it is industry specialism, at both national and city level, and not just brand name that contributes to fee premia and auditor selection choices (Ferguson et al., 2003, 2006; McMeeking et al., 2006; Basioudis and Francis, 2007). This study found that in eleven sectors, one or more mid-tier firms audited at least 2% audit fees, and in 9 sectors a mid-tier firm's market share exceeded that of one of the B4 firms. It is concluded that an effective challenge from the mid-tier firms could be made in these industries, especially if these firms adopted an investment and marketing strategy based on industry specialism. This challenge would be assisted by the implementation of the recommendations of the FRC (2007b) audit choice study.

Andersen's demise served to reduce the level of inequality between the top tier firms, with Deloitte capturing approximately 70% of Andersen clients and total audit fees. Thus, consistent with the findings of Comunale and Sexton (2003) in the US context and Ballas (2005) in the EU context (but contrary to popular belief) the exit of a top tier firm does not necessarily result in increased market concentration. However, PwC retained its position as a 'dominant firm', with 40% market share (based on audit fees) and market leader status in 18 out of 34 industry sectors in 2003.

There is evidence that the audit fee rate of listed UK companies increased markedly following Andersen's demise, especially in the case of the smallest companies. Several possible explanations exist. First, the Enron scandal may have lifted the intense downward pressure on audit fees by companies, due to their desire to instil confidence about audit quality in the financial market participants after this was damaged by Andersen's misconduct (the 'Andersen effect'). Thus, companies wanted more effort from their auditor, placing upward pressure on audit fees. Second, smaller companies may be perceived to be more risky, resulting in a higher insurance component in the audit fee. Third, Big 4 auditors may have adopted a strategy of reducing their client portfolios through auditing fewer small (possibly riskier) clients, retaining only those small company clients that were willing to pay a substantially higher fee. The finding that Big 4 audit market share (in terms of clients) has fallen significantly could reflect some small companies switching auditor to avoid such a fee increase. Moreover, since audit firms undertook additional audit work as a result of the Andersen effect, they may have hit capacity constraints, forcing resignations from certain engagements (small, risky client companies).³⁰ Finally, the audit fee rises may simply reflect changes in the general economic climate.

³⁰ We are grateful to an anonymous reviewer for suggesting the second and third possible explanations.

In relation to former Andersen clients, there was no significant above-inflation change in audit fees paid by them to their new auditors. The lack of evidence to indicate that recent structural changes have resulted in anticompetitive pricing is consistent with Duxbury et al.'s (2007) modelling of the UK setting. It contrasts, however, with the evidence in Australia, where former Andersen clients paid higher audit fees (Hamilton et al., 2008) and in the US, where initial fee discounts were reported (Chi, 2006). For non-Big 4 successor auditors in the UK, we find a median decline in audit fee of –10.0%. This can be attributed to the loss of the Big 4 audit premium and/or more significant fee discounting on initial audit engagements by small auditors (as found in the US by Ghosh and Lustgarten, 2006). Moves to Big 4 auditors other than Deloitte Touche (who acquired most of the Andersen UK business) were not accompanied by an audit fee premium yet there was also no evidence of general fee discounting, both in contrast with the US (Chi, 2006). Overall, the UK audit market response to Andersen's decline seems to have been relatively benign, leading to a restrained 'business as usual' effect.

The lower level of observed NAS in the year of change to a new auditor following Andersen's demise provides little evidence of either knowledge spillover effects or cross-subsidisation of audit fees. Rather, it is consistent with a client (and audit firm) response to concerns over the potential impact of NAS on perceptions of auditor independence.

The combined findings provide no evidence to indicate that recent structural changes have resulted in anticompetitive pricing in the UK listed company audit market. The key concerns remain the lack of audit firm choice and issues concerning the governance and accountability of audit firms. There is no reason to expect that this conclusion would be substantively different if another top tier audit firm ceased. While concentration levels may increase if the market leader (PwC) was one of the remaining three firms and obtained a significant proportion of the demised firm's clients, strong forces in the audit market maintain competitiveness. However, the choice problem would become extremely critical. The most recent progress report on choice in the UK audit market FRC (2009) reports on measures designed to aid market solutions to high concentration levels. Concentration levels as at August 2009 are reported to be broadly stable, with the non-Big Four's market share (based on number of audits) for the FTSE 100, FTSE 250, FTSE Small Cap/Fledgling and AIM market segments being 1%, 6%, 20.5% and 55.1%, respectively. In the US, no 'immediate action' to reduce concentration is considered necessary (GAO, 2008). It appears that regulators are maintaining a careful watching brief to give market solutions the opportunity to take effect. Given the often unintended adverse consequences of regulatory intervention, this approach seems optimal.

Inevitably, this study suffers from limitations, some of which offer avenues for future research. First, we only examine the short-term impact of Andersen's demise; further research is required to consider the medium to long-term effects. Second, the analysis does not distinguish follower from non-follower ex-Andersen clients, as we were unable to identify a public source of this data; US research has shown that this characteristic influenced post-auditor change fee levels. Finally, further longitudinal research on recent industry effects in the UK market, building on the 2003 situation presented in this paper, would be desirable.

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