

# Comments on Deloitte's audit pricing analysis

**Note prepared for BDO and  
the Competition Commission**

**May 24th 2012**

**1**

## Introduction

This note contains a number of comments on the non-confidential version of Deloitte's econometric analysis of audit pricing, dated February 27th 2012.<sup>1</sup> Given that a new database is currently being created by the Competition Commission (CC) and the parties, and that the CC is likely to carry out its own econometric analysis, the comments are limited to matters of practical relevance for current and future analysis—in particular, data and variable specification. Oxera would be happy for this note to be published on the CC website or shared directly with Deloitte.

**2**

## Data

The stated objective of Deloitte's report is 'to investigate the integrity of the econometric analysis undertaken by Oxera and subsequently by the Office of Fair Trading' (p.1).<sup>2</sup> Deloitte does not review other recent UK studies—such as those by academics from the London School of Economics and Cardiff Business School<sup>3</sup>—or other published articles that cover the relationship between price and concentration in the audit market.

<sup>1</sup> Deloitte (2012), 'Audit pricing analysis', non-confidential version, February 27th. This document was published on the CC website at the end of April 2012.

<sup>2</sup> The reference to Oxera's report is Oxera (2006), 'Competition and choice in the UK audit market', prepared for the Department of Trade and Industry and Financial Reporting Council, April.

<sup>3</sup> LSE Enterprise—Kittsteiner, T. and Selvaggi, M. (2008), 'Concentration, auditor switching and fees in the UK audit market', ELSE Research Report prepared for BDO, February; and Cardiff Business School—Peel, M.J. (2012), 'The Pricing of Initial Audit Engagements by Big 4 and Leading Mid-tier Auditors', January. Both studies have been published on the CC website.

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## 2.1

### Period of analysis

Oxera notes that Deloitte's own data and analysis cover the period 2002–11, whereas Oxera's 2006 study for the Department of Trade and Industry and Financial Reporting Council covered the period 1995–2004. There is hence some overlap between the Oxera and Deloitte periods of analysis, but for the most part they are distinct.

The advantage of using the earlier period is that it captures the impact of greater variation in audit market concentration over time, with the Price Waterhouse/Coopers & Lybrand merger in 1998 and the Arthur Andersen dissolution (and resulting UK merger with Deloitte) in 2002. In addition, analysing the later period may be complicated because of the effects of the financial crisis.

We understand that recent years are of more relevance to the current CC inquiry. However, looking at only the last ten years—in which no further consolidation among the large firms took place—means that the analysis of audit fees will have to place greater weight on cross-sector variation in concentration levels (ie, are fees in different sectors related to the degree of auditor concentration in each sector?) than on variation over time (ie, fees being influenced by changes in concentration over the years).<sup>4</sup>

## 2.2

### Use of FAME database

Oxera and several other studies have used the public FAME database for the analysis of audit fees.

Deloitte (p. 5) claims that Oxera's report makes no comments on data cleaning, and infers from this that there is a 'likelihood that Oxera and the OFT have performed no similar data cleansing'. This is incorrect. Oxera's report (section 2.4) contains a high-level description of the dataset based on FAME and the exclusion of observations from this dataset for the purpose of the analysis. Oxera provided more details of its data cleaning process in a note to the CC dated February 29th 2012, which was prepared ahead of the data meeting with various parties at the CC's offices on March 6th.<sup>5</sup>

The following table summarises the number of company-year observations dropped from Oxera's dataset due to each of the various exclusion criteria that were applied. It can be seen that a significant proportion of data was excluded (41%—this proportion is higher than the proportion of data corrections flagged by Deloitte in Table 3 of its report).<sup>6</sup> At the same time, the number of observations in the dataset remained large, and there is no apparent reason why any remaining errors should be biased one way or another.

<sup>4</sup> A possible cross-check that the CC could carry out is a pure cross-sectional analysis for specific years, thus avoiding the potential issues arising out of the use of the time-series data and/or lagged variables (the Oxera report used lagged variables in some, but not all, model specifications).

<sup>5</sup> Oxera would be happy for that note to be shared with Deloitte.

<sup>6</sup> In relation to audit fees, its main area of data cleaning, Deloitte reports a minimum of 17% of data points corrected, and a maximum of 30%.

**Table 2.1 Criteria for excluding observations from FAME in the Oxera 2006 study**

Criterion	Number of observations dropped	Total remaining sample size
FAME dataset (before diagnostic tests)	–	11,260
No data on audit fee, turnover or name of the auditor firm	4,391	6,869
Negative turnover	2	6,867
Audit fees exceeding company's turnover	5	6,862
AIM companies	210	6,652
Audit fee-to-turnover ratio exhibits outlying behaviour	29	6,623

Note: The number of company-year observations removed is determined by the order in which the criteria are applied, since an observation may have more than one inaccuracy associated with it.

Source: Oxera panel dataset for the 2006 study.

## 3 Variables

### 3.1 Use of control variables

Deloitte (Table 4) identifies a number of explanatory variables that could be relevant for the CC's analysis. These include company size measured by assets, company debt-to-equity ratio, and a dummy variable for company losses.<sup>7</sup>

However, we do not agree that these variables are superior to those used by Oxera, or that the Oxera analysis suffers from omitted-variable bias. Oxera comprehensively controlled for all of the main categories of drivers of audit fees, by including a range of control variables and sector, year and market-type dummies.<sup>8</sup>

Instead, the various explanatory and control variables used by Oxera, Deloitte and other studies should be regarded as potentially complementary. They each have some inherent limitations and it is difficult, *a priori*, to prefer one over another. Instead, each variable can be tested by the CC when it carries out its own econometric analysis, subject to the usual checking for multicollinearity, and careful consideration of which variables control for which external factor.

### 3.2 Further possible variables

BDO and Oxera previously suggested a range of additional variables that the CC could explore.<sup>9</sup> To help to measure the complexity of the ownership structure, and potentially also the complexity of tax affairs, the CC could consider the number of different countries of incorporation of the company's subsidiaries. To help to measure the level and to some extent the complexity of corporate financing activity, a potential variable could be the amount of gross new financing raised (debt and equity) in each of the current and last financial years, in each case as a percentage of total assets. To help to measure risk (to the auditor), the CC could look at the number of investigations launched into audit practices relating to companies

<sup>7</sup> We note that, in Deloitte's final model specification (Table 6), only three explanatory variables have a statistically significant coefficient.

<sup>8</sup> Oxera's model did not account for possible endogeneity between price and concentration variables (and nor does Deloitte's model). At a meeting between Oxera and the CC on January 17th 2012 to discuss the 2006 Oxera report (and a 2007 Oxera report for the European Commission), Oxera suggested that the CC try estimating more advanced structural models that can deal with such endogeneity. See Oxera (2012), 'Methodologies for audit market investigation: lessons from Oxera's 2006 and 2007 studies', prepared for the Competition Commission, January 17th (published on the CC website).

<sup>9</sup> Email from Berwin Leighton Paisner to the CC dated March 27th 2012.

in the relevant sector in the UK in the last five years, and the value of audit-related fines imposed in the UK on auditors in relation to audits of companies in that sector in the last five years, expressed relative to average sector enterprise value over the last five years. Lastly, the CC could use lagged indicators, such as whether a company made a loss in the previous financial year.

### 3.3

## Improvements to Deloitte's analysis

Deloitte's analysis omits geographic spread as an explanatory variable. It is well understood that the degree of overseas activity of a company influences the complexity of the audit. Oxera's study found that the 'international turnover' variable—defined as the ratio of non-UK turnover to total turnover—consistently had a positive and statistically significant effect on audit fees (see Table 5.4).

Deloitte excludes this variable, but it is not clear why. Deloitte seems to refer to a dataset for this variable in which the 'maximum values exceed 100% in some cases', and describes this as an 'obvious variable-measurement error' (p. 14). This cannot be a reference to Oxera's dataset, which had no values over 100% for international turnover (and to which Deloitte, in any event, has not had access).<sup>10</sup> In Oxera's dataset, the variable 'international turnover' had a mean value of 0.23 with a standard deviation of 0.33.<sup>11</sup> In any event, even if the data that Deloitte has access to contains such errors, Deloitte could have cleaned or corrected it, given the importance of this variable as a proxy for audit complexity. That would have been preferable to omitting the variable entirely.

Another Oxera variable that Deloitte unduly criticises is 'mergers'. Oxera approximated this by considering instances where turnover increased by more than 40% from 1996 up to a given year (see Oxera Table 5.3). Clearly, the 40% cut-off point is arbitrary, but Oxera considered it to be a reasonable approximation, and in most of Oxera's regressions it had the expected positive and statistically significant effect on audit fees.

Deloitte considers the 40% level to be too high (p. 11), and states that 'the estimated causal effect of the merger variable will be biased, and will not capture all of the impact that corporate activity has had on audit fees'. Oxera disagrees. When there is uncertainty about the precise threshold, it would seem preferable to set it conservatively, such that those observations included as mergers have a greater likelihood of actually reflecting a merger (this is sensible in terms of balancing the probability of type I and type II errors). Oxera also notes that Deloitte's proposed alternative threshold of 10% increase in turnover (which carries a greater risk of including observations that are not actually mergers) does not seem to work well as a control variable since, in Deloitte's results, it is statistically significant but with a negative sign—ie, a merger leads to lower audit fees (Table 5). Deloitte does not comment on this counter-intuitive finding when it discusses the results of its econometric analysis.

Lastly, Deloitte's approach does not test directly for a Big Four premium, despite the fact that several empirical studies—including those of Oxera, the LSE and Cardiff Business School mentioned above—have found evidence of such a premium. Whether due to market power, reputation, higher quality, or a combination of all these factors, the existence or otherwise of a Big Four premium matters for the analysis of competition in the audit market.

<sup>10</sup> Deloitte (p. 14) states that international turnover is the 'exports' variable in Oxera's specification. This is incorrect. In Oxera's study the variable is called 'international turnover'.

<sup>11</sup> The minimum value was 0 (companies with 100% of turnover in the UK), and a small number of companies had 1 (no UK turnover—this included BHP Billiton, Pacific Media, The Narborough Plantations, and Anglo Pacific Group).