

# Management Ownership and Audit Firm Size\*

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## Abstract

The finance literature identifies two agency problems between managers and outside shareholders. First, there is a divergence-of-interests problem as management ownership falls. Second, there is an offsetting entrenchment problem when management ownership increases within intermediate regions of ownership. Agency problems are mitigated through contracting, but contracts are often based on accounting numbers prepared by management. Because accounting numbers must be reliable for contracts to be enforced, agency theory predicts a demand for higher-quality auditors when agency problems are more severe. However, extant studies find no significant or robust relation between management ownership and audit firm size. In contrast to extant research, this study samples unlisted companies rather than listed companies for two reasons. First, the monitoring value of auditing may be higher in unlisted companies because they are less vulnerable to takeover and they are required to disclose much less nonaccounting information to shareholders. Second, unlisted companies have greater variation in management ownership, which permits more powerful tests of the demand for auditing as ownership varies between 0 percent and 100 percent. Consistent with a divergence-of-interests effect, the association between management ownership and audit firm size is found to be significantly negative within low and high regions of management ownership. The association is flatter and slightly positive within intermediate regions of management ownership, suggesting the existence of an opposite entrenchment effect. The negative association and the nonlinearity is consistent with the finance literature and with the predictions of agency theory.

**Keywords** Agency theory; Audit firm size; Management ownership

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## **Lien entre la participation des cadres dans les capitaux propres et la taille des cabinets d'expertise comptable**

### **Condensé**

Les études existantes du domaine de la finance révèlent que le niveau de participation des cadres dans les capitaux propres (participation des cadres) soulève deux problèmes liés à la relation mandant-mandataire entre cadres et actionnaires (Morck, Shleifer et Vishny, 1988). Le premier de ces problèmes a trait à la divergence d'intérêts, c'est-à-dire au fait que les cadres dont la participation est modeste sont moins enclins à agir dans l'intérêt des actionnaires « extérieurs ». Le second problème découle de l'effet de retranchement : les cadres qui détiennent une participation importante exercent davantage de contrôle sur la société et, par conséquent, jouissent d'une plus grande latitude pour agir dans leur propre intérêt (Holderness et Sheehan, 1991). En théorie, les problèmes liés à la délégation accroissent la demande de services de vérification de qualité supérieure (Watts et Zimmerman, 1983). À l'instar de chercheurs précédents (Francis et Wilson, 1988 ; DeFond, 1992), l'auteur pose l'hypothèse que les grands cabinets d'expertise comptable offrent des services de vérification de meilleure qualité. Il vérifie les pronostics de la théorie de la délégation en examinant le lien entre la participation des cadres et la taille du cabinet d'expertise comptable (taille du cabinet).

Dans les études existantes portant sur le choix des vérificateurs, les chercheurs recourent à la participation des cadres pour circonscrire les problèmes liés à la relation mandant-mandataire entre cadres et actionnaires, et à la taille du cabinet pour définir la qualité des services de vérification (Francis et Wilson, 1988 ; DeFond, 1992). Selon l'hypothèse de ces chercheurs, plus la participation des cadres est faible, moins ces derniers sont enclins à agir dans l'intérêt des actionnaires extérieurs, ce qui accroît la demande de services de vérification de qualité supérieure. Ils estiment donc que la divergence d'intérêts laisse supposer l'existence d'un lien négatif entre la participation des cadres et la taille du cabinet. Or, les constatations empiriques tirées de ces études ne sont pas concluantes à cet égard. Francis et Wilson (1988) jugent ce lien non significatif, et DeFond (1992) fait état d'un faible lien négatif qui n'est significatif que pour certaines spécifications du modèle.

La présente étude diffère des précédentes à deux égards. Premièrement, l'auteur examine le lien entre la participation des cadres et la taille du cabinet pour les sociétés non cotées, alors que les études précédentes portaient exclusivement sur les sociétés cotées. La valeur du rôle de surveillance joué par la vérification peut être plus importante dans les sociétés non cotées, et cela pour deux raisons. D'abord, le cours des titres sur le marché boursier livre de l'information aux actionnaires des sociétés cotées qui peuvent ainsi mieux surveiller les agissements des cadres. Ensuite, les investisseurs des sociétés cotées font face à une moins grande asymétrie de l'information, compte tenu des exigences des marchés boursiers en matière d'information. C'est pourquoi il est plausible que les investisseurs des sociétés non cotées exigent davantage d'information comptable crédible que les investisseurs des sociétés cotées.

Deuxièmement, l'auteur de la présente étude s'intéresse à deux problèmes, celui de la divergence d'intérêts et celui du retranchement, tandis que les études précédentes portent uniquement sur le premier. Il importe d'analyser ces deux problèmes, car ils mènent à des pronostics différents quant à la relation entre la participation des cadres et la taille du cabinet. Les études du domaine de la finance montrent que l'effet de la divergence d'intérêts domine

dans les zones où la participation des cadres est faible et dans celles où elle est élevée (par exemple, Morck *et al.*, 1988). C'est pourquoi une relation négative entre la participation des cadres et la taille du cabinet est prévisible dans ces zones. Ces études posent également l'hypothèse de l'existence d'un effet compensatoire de retranchement dans les zones intermédiaires de participation des cadres (par exemple, Morck *et al.*, 1988). Sur le plan théorique, il est difficile de dire si c'est la divergence d'intérêts ou le retranchement qui domine, si bien qu'aucune prédiction n'est formulée au sujet du signe de la relation entre la participation des cadres et la taille du cabinet dans les zones de participation intermédiaires.

Pour pouvoir vérifier les effets de la divergence d'intérêts et du retranchement, il est essentiel de constituer un échantillon contenant un très large éventail de niveaux de participation des cadres. Il s'agit d'un autre avantage appréciable de l'échantillonnage de sociétés non cotées. Dans les sociétés cotées, la concentration de la participation des cadres est rare, de sorte que les études existantes ne fournissent pas de tests convaincants portant sur la participation dans les zones où cette dernière est élevée. Ainsi, l'échantillon de Morck *et al.* (1988) ne compte que 14 sociétés dans lesquelles la participation des cadres excède 50 %. Dans la présente étude, la participation des cadres varie entre 0 % et 100 %, et plus de la moitié des 540 sociétés de l'échantillon affichent une participation des cadres excédant 50 %. L'échantillon de sociétés non cotées permet donc l'examen du lien entre la participation des cadres et la taille du cabinet dans les zones où la participation est faible, intermédiaire et élevée.

Les résultats de la présente étude confirment de façon convaincante le pronostic de lien négatif entre la participation des cadres et la taille du cabinet dans les zones où cette participation est faible et dans celles où elle est élevée. Cette constatation corrobore l'existence d'un effet dominant de la divergence d'intérêts dans ces zones. Le lien entre la participation des cadres et la taille du cabinet est moins saillant et légèrement positif dans les zones de participation intermédiaires, ce qui confirme l'existence d'un effet de retranchement compensatoire. Ces résultats résistent à l'utilisation de différents seuils délimitant les zones de participation et à la formulation d'une fonction linéaire par morceaux ou d'une fonction curvilinéaire. L'auteur conclut à la non-linéarité marquée du lien entre la participation des cadres et la taille du cabinet, non-linéarité qui converge avec les résultats des études précédentes en finance et avec la théorie de la délégation.

## 1. Introduction

The finance literature finds that levels of management ownership reflect two agency problems between managers and shareholders (Morck, Shleifer, and Vishny 1988). First, there is a divergence-of-interests effect, such that managers with smaller shareholdings have weaker incentives to act in outside shareholders' interests. Second, there is an entrenchment effect, such that managers with larger shareholdings have greater control over the company and therefore greater scope for acting in their own private interests (Holderness and Sheehan 1991). Agency theory predicts that these agency problems increase the demand for high-quality audits (Watts and Zimmerman 1983). Following extant research (Francis and Wilson 1988; DeFond 1992), this study assumes large audit firms provide higher-quality audits. The predictions of agency theory are tested by examining the association between management ownership and audit firm size.

Extant auditor choice studies use management ownership to capture agency problems between managers and shareholders, and they use audit firm size to capture auditor quality (Francis and Wilson 1988; DeFond 1992). These studies hypothesize that, as management ownership falls, managers have weaker incentives to act in the interests of outside shareholders, which increases the demand for high-quality audit firms. These studies therefore predict that a divergence-of-interests effect results in a negative association between management ownership and audit firm size. The empirical findings from these studies do not strongly support the predicted negative association. Francis and Wilson find no significant association, and DeFond finds a weak negative association that is significant for some model specifications but not for others.

This paper differs from prior studies in two ways. First, I examine the association between management ownership and audit firm size in unlisted companies, whereas prior research is for listed companies. The monitoring value of auditing may be lower in listed companies for two reasons. First, stock market prices provide information to shareholders, thereby helping them monitor managers' actions. Second, investors in listed companies suffer from less information asymmetry due to the disclosure requirements of stock markets. Therefore, investors in unlisted companies may have a greater demand for credible accounting information compared with investors in listed companies.

The second difference is that this study considers both the divergence-of-interests problem and the entrenchment problem whereas prior studies test only the divergence-of-interests problem. It is important to consider both problems because they have different predictions about the relation between management ownership and audit firm size. The finance literature indicates the divergence-of-interests effect is dominant within low and high regions of management ownership (e.g., Morck et al. 1988). Therefore, a negative relation between management ownership and audit firm size is predicted within low and high regions of management ownership. The finance literature also posits an offsetting entrenchment effect within intermediate regions of ownership (e.g., Morck et al.). It is theoretically ambiguous whether the divergence-of-interests effect or the entrenchment effect dominates, so no prediction is made about the sign of the association between management ownership and audit firm size within intermediate regions of ownership.

In order to test the divergence-of-interests and entrenchment effects, it is important for the sample to have considerable variation in management ownership, which is another important advantage of sampling unlisted companies. Few listed companies have concentrated management ownership, so extant studies are unable to provide powerful tests of ownership effects within high regions of ownership. For example, the sample of Morck et al. 1988 includes only 14 companies with management ownership in excess of 50 percent. In this study, management ownership varies between 0 percent and 100 percent, and more than half of the 540 sample companies have management ownership in excess of 50 percent. The unlisted sample therefore permits an examination of the association between management ownership and audit firm size across low, intermediate, and high regions of ownership.

The results strongly support the predicted negative associations between management ownership and audit firm size within low and high regions of management ownership. This finding is consistent with a dominant divergence-of-interests effect within low and high regions of ownership. The association between management ownership and audit firm size is flatter and slightly positive within intermediate regions of ownership, which is consistent with an offsetting entrenchment effect. The results are robust to using different thresholds for the ownership regions and to using either piece-wise linear or curvilinear functional forms. I conclude that the relation between management ownership and audit firm size is highly nonlinear, and the nonlinearity is consistent with the finance literature and agency theory.

Section 2 discusses the extant literature on management ownership, agency problems, audit firm size, and audit firm quality. The auditor choice model and the predicted association between management ownership and audit firm size are described in section 3. In section 4, I discuss the sample and provide descriptive statistics. Section 5 reports the main results and section 6 concludes.

## 2. The extant literature

This section first discusses evidence from finance studies on the relation between management ownership and agency problems. Next, it discusses evidence from accounting studies on the relation between audit firm size and audit quality. Finally, it develops predictions about the association between management ownership and audit firm size.

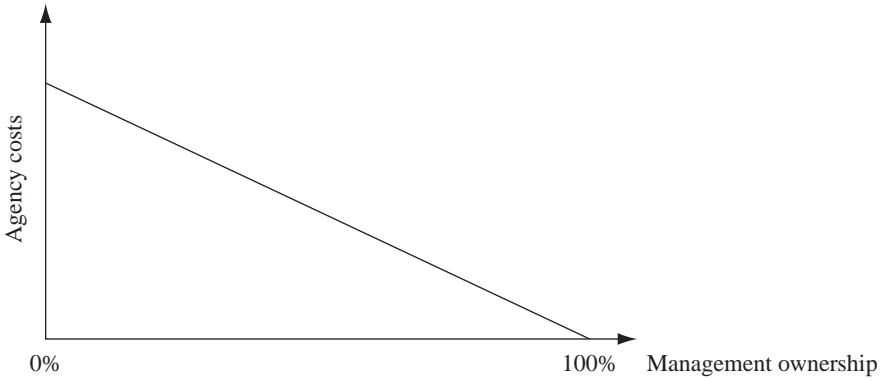
### *Management ownership and agency costs*

The finance literature shows management ownership affects agency costs in two ways. First, there is a divergence-of-interests effect such that managers with smaller shareholdings have weaker incentives to act in the interests of outside shareholders.<sup>1</sup> Accordingly, the divergence-of-interests effect is expected to result in higher agency costs when management ownership is lower, as shown in panel A of Figure 1. When managers own 100 percent of the equity, their incentives are fully aligned with shareholders, and so the agency costs of equity are zero.

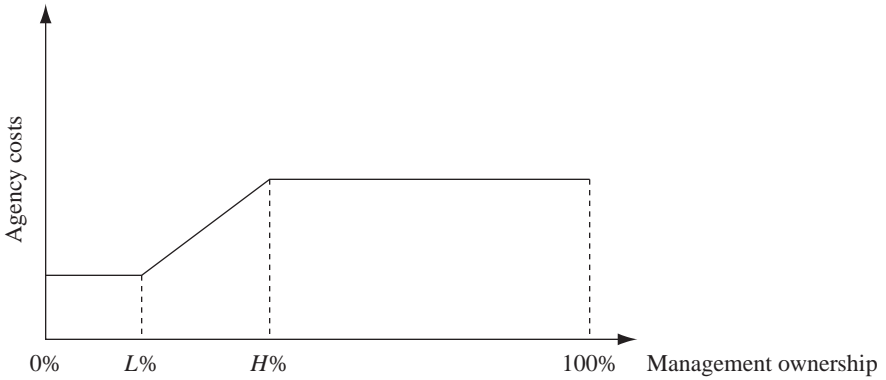
Second, there is an entrenchment effect such that managers have more scope for behaving opportunistically when they have greater control. Morck et al. (1988) argue that greater management ownership allows deeper entrenchment and therefore greater scope for opportunism. By definition, a manager who is already fully entrenched does not gain any additional control from further increases in his shareholdings. At the other end of the scale, a manager with (close to) zero shareholdings is unlikely to gain any meaningful increase in control from a small increase in ownership (for example, from 0 to 2 percent). These arguments suggest that increases in management shareholdings serve to increase management control (entrenchment) within an intermediate region of ownership only. In panel B of Figure 1, the entrenchment effect lies in the region L percent to H percent, where L and H represent low and high ownership thresholds. The degree of management control (and hence the scope for opportunism) increases as management ownership

**Figure 1** The hypothesized relation between management ownership and agency costs

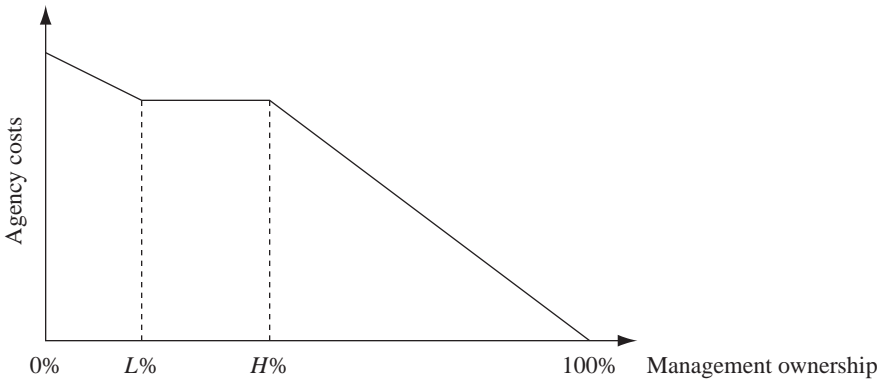
**Panel A:** Divergence-of-interests effect



**Panel B:** Entrenchment effect



**Panel C:** Divergence-of-interests and entrenchment effects combined



increases above L percent. Management is fully entrenched at H percent, and so further increases in ownership do not increase management control.

As noted by Morck et al. 1988, theory does not predict where the intermediate region lies — this is an empirical issue that can only be resolved by examining the data. U.S. evidence suggests that there is an entrenchment effect in the 5 to 25 percent ownership region. Short and Keasey (1999) argue that UK managers face greater threats from hostile takeovers compared with U.S. managers because takeover defenses such as poison pills are less common in the United Kingdom. As a result, UK managers need to have larger shareholdings in order to become entrenched compared with U.S. managers. Short and Keasey therefore predict the entrenchment effect occurs at higher levels of ownership in the United Kingdom compared with the United States. Consistent with this, they find an entrenchment effect for the United Kingdom in the 12 to 40 percent ownership region. Because this study uses UK data, it is expected that the entrenchment effect lies within a similar ownership region.

Panel C combines the divergence-of-interests and entrenchment effects in order to predict the net relation between agency costs and management ownership. Within the low region (between 0 and L percent), there is a negative divergence-of-interests effect and no entrenchment effect, so agency costs are decreasing as management ownership increases. Within the intermediate region (between L and H percent), there is a negative divergence-of-interests effect and a positive entrenchment effect, so agency costs may be increasing or decreasing as management ownership increases. The net relation between management ownership and agency costs is therefore ambiguous within the intermediate region. For convenience, panel C of Figure 1 depicts the two effects as fully offsetting (that is, the association is flat within the intermediate region). Within the high region (between H and 100 percent), there is a negative divergence-of-interests effect, but there is no entrenchment effect because management is already fully entrenched. Therefore, agency costs decrease as management ownership increases within the high region. Although managers with 100 percent ownership are fully entrenched, their incentives are fully aligned with shareholders and so the agency costs of equity are zero (Ang, Cole, and Lin 2000).

There are two potential criticisms of the analysis presented in Figure 1. First, the ownership thresholds (L and H) are “ad hoc” because theory does not predict where the thresholds are. This study reports results for alternative thresholds (L = 5, 10, 15 and H = 25, 40, 50) in order to check whether the findings are robust. Second, Morck et al. (1988) estimate piece-wise linear models and panel C of Figure 1 similarly assumes linear relations within the low, intermediate, and high ownership regions. This is a potential problem because linearity implies sudden rather than gradual turning points at the ownership thresholds. Short and Keasey (1999) avoid this problem by using curvilinear functional forms rather than piece-wise linear. This study uses both curvilinear and piece-wise linear functional forms to check whether the results are robust.

*Audit firm size and audit quality*

Extant accounting studies provide strong evidence that large audit firms provide higher-quality audits compared with small firms. Craswell, Francis, and Taylor (1995) find large audit firms earn significantly higher fees, and they attribute part of this premium to greater investments in expertise by large audit firms. Becker, DeFond, Jiambalvo, and Subramanyam (1998) find large audit firms' clients are less likely to engage in earnings management compared with small audit firms' clients. UK studies also support the view that large audit firms supply higher-quality audits. In the United Kingdom, large audit firms earn fee premiums of up to 50 percent over small audit firms (Ireland and Lennox 2002), and large audit firms' going-concern opinions are more accurate predictors of bankruptcy compared with small audit firms' going-concern opinions (Lennox 1999).

Consistent with prior research, this paper captures audit firm quality using a dummy variable that indicates whether the firm is one of the Big 5. Although some studies posit that auditor industry specialization could be an alternative measure of audit quality, I do not examine industry specialization for two reasons. First, evidence on firm-level specialization is rather mixed. McMeeking, Pope, and Peasnell (1999) find no evidence of an industry specialization fee premium for UK audit firms. Recent evidence also suggests that the firm-level specialization premium has disappeared in Australia (Ferguson and Stokes 2002), although there is evidence of specialization at the office level (Ferguson, Francis, and Stokes 2003). Second, this paper focuses on unlisted companies, and specialization data are unavailable in the unlisted client market. Moreover, it is unclear whether industry specialists in the listed client market have the same specializations in the unlisted client market.

*The predicted association between management ownership and audit firm size*

As illustrated in panel C of Figure 1, agency costs are expected to fall as management ownership increases within low and high ownership regions. Agency costs may rise, fall, or remain constant as ownership increases within the intermediate region. Agency theory predicts that managers and outside shareholders have incentives to agree to contracts that reduce agency costs. These contracts may be explicit (for example, management compensation) or implicit (for example, the threat of dismissal). Contracts are often based on accounting numbers — for example, managers that report lower earnings receive lower compensation and are more likely to be dismissed. Contracting alone may not be sufficient to reduce agency costs because managers prepare the accounting numbers on which contracts are based. For example, if earnings are low, managers have incentives to overstate earnings in order to increase their compensation and to reduce the likelihood of dismissal. Without an independent auditor who attests to managers' financial statements, contracts may not be enforced and management opportunism reemerges.

Entrenched management has greater scope for opportunism. For example, entrenched managers have more power to arrange related party transactions on terms that are advantageous to themselves, and they have more power to invest in projects that increase their prestige even if the investments have negative net present values. Auditing helps prevent managerial opportunism because auditing



makes it more difficult for managers to conceal the consequences of their actions from investors. For example, auditors verify companies' disclosures about related party transactions, and auditors check financial statements that reflect the outcome of managers' past investment decisions. Managers can therefore bond themselves to outside shareholders by employing high-quality audit firms. If auditing helps outside shareholders to monitor managers' actions, the demand for high-quality audits is expected to be greater when managers have stronger incentives to behave opportunistically and when they have more scope to behave opportunistically. Agency theory therefore predicts a positive association between agency costs (that is, the potential for management opportunism) and the employment of high-quality audit firms (Watts and Zimmerman 1983).<sup>2</sup>

If audit firm size and audit quality are positively related, agency theory predicts that companies are less likely to hire large audit firms when agency costs are lower. Panel C of Figure 1 shows agency costs are lower as management ownership increases within the low ownership region (between 0 and L percent) due to the dominant divergence-of-interests effect. Therefore, the association between management ownership and audit firm size is expected to be negative within the low ownership region. Agency costs are lower as management ownership increases within the high ownership region (between H and 100 percent) due to the dominant divergence-of-interests effect. Therefore, the association between management ownership and audit firm size is expected to be negative within the high ownership region. Within the intermediate ownership region (between L and H percent), it is unclear whether the divergence-of-interests effect or the entrenchment effect is dominant, so agency costs could rise or fall as management ownership increases. Therefore, the association between management ownership and audit firm size is ambiguous within the intermediate ownership region.

### 3. The auditor choice model

#### *The association between management ownership and audit firm size*

A piece-wise linear relation between management ownership and audit firm size is posited by (1), as follows:

$$AUD = \alpha_1 MOWN\_LOW + \alpha_2 MOWN\_INTERM + \alpha_3 MOWN\_HIGH + CONTROLS + u \quad (1).$$

The dependent variable (*AUD*) equals one if the audit firm is one of the Big 5 (zero otherwise). Management ownership (*MOWN*) is the beneficial ordinary shareholdings of executive directors. I use executive ownership rather than board ownership because the aim is to capture agency problems between managers and outside shareholders. The three ownership variables in (1) are defined as follows:

$$\begin{aligned}
 MOWN\_LOW &= MOWN && \text{if } MOWN < L \text{ percent} \\
 &= L \text{ percent} && \text{if } MOWN \geq L \text{ percent}
 \end{aligned}$$

$$\begin{aligned}
 MOWN\_INTERM &= 0 && \text{if } MOWN < L \text{ percent} \\
 &= MOWN \text{ minus } L \text{ percent} && \text{if } L \text{ percent} < MOWN < H \text{ percent} \\
 &= H \text{ percent minus } L \text{ percent} && \text{if } MOWN \geq H \text{ percent} \\
 MOWN\_HIGH &= 0 && \text{if } MOWN < H \text{ percent} \\
 &= MOWN \text{ minus } H \text{ percent} && \text{if } MOWN \geq H \text{ percent}
 \end{aligned}$$

Within the low and high ownership regions, the association between management ownership and audit firm size is expected to be negative ( $\alpha_1 < 0$  and  $\alpha_3 < 0$ ). Within the intermediate region, the association between management ownership and audit firm size is ambiguous, so it is not possible to predict the sign of  $\alpha_2$ .

A curvilinear relation between management ownership and audit firm size is posited by (2), as follows:

$$AUD = \beta_1 MOWN + \beta_2 MOWN^2 + \beta_3 MOWN^3 + CONTROLS + u \quad (2).$$

The relation between ownership and auditor size is expected to be negative over low ownership levels and the negative coefficient is expected to become smaller as ownership increases. The relation between ownership and auditor size is expected to be negative over high ownership levels and the negative coefficient is expected to become larger as ownership increases. Therefore, the coefficient signs in (2) are expected to be  $\beta_1 < 0$ ,  $\beta_2 > 0$ , and  $\beta_3 < 0$ . Logit models are used to estimate both (1) and (2).

### ***Why do firms have variation in management ownership?***

Prior studies suggest a number of reasons why firms have variation in management ownership. Pagano and Roëll (1998) argue that managers sell shares to outsider investors when they require funds to finance investment projects. Consistent with this argument, Pagano, Panetta and Zingales (1998) find companies are more likely to go public when they are involved in major investment projects. Raising external finance dilutes management ownership and therefore creates an agency problem between management and shareholders. The effects of dilution are captured using the management ownership variables. The effect of future financing needs is captured using the free cash flow variable found in Dechow, Sloan, and Sweeney 1996. Free cash flow (*FREEC*) equals cash from operations minus capital expenditure divided by current assets. When free cash flow is low, the company is less able to finance capital expenditure using internal funds. A negative relation is expected between *FREEC* and audit firm size if companies appoint higher-quality auditors in anticipation of future external financing. Because *FREEC* has outliers, observations in the bottom 5 percent and top 95 percent of the distribution are winsorized (in untabulated tests we find similar results without winsorizing).

Profitability is another factor that can influence management ownership (Pagano et al. 1998). A more profitable company has less need for external equity because it can finance its investments using internally generated funds. On the

other hand, a company with high temporary profitability may have more incentive to sell shares if its shares are overvalued. Profitability may also influence the company's choice of auditor. If more profitable companies use internally generated funds to finance future projects, they are less likely to appoint larger audit firms. Profitability (*PROFIT*) is measured as the ratio of operating profit to total assets.

Pagano et al. (1998) argue that industry-specific factors influence management ownership. Industry sectors with high growth opportunities have higher investment needs and so are likely to have lower management ownership. Moreover, if managers have more information than investors regarding industry trends, managers may try to time the market by issuing equity when their companies' industry sectors are overvalued. The auditing literature suggests industry factors can also influence the company's choice of audit firm. The auditor choice model controls for industry effects using two-digit Standard Industrial Classification (SIC) codes. A dummy variable is included for each two-digit sector that has 10 or more companies.

When companies raise equity finance there is a potential adverse selection problem because managers know more about their companies compared with investors. Pagano et al. (1998) argue the adverse selection problem is more severe for smaller and younger companies.<sup>3</sup> The adverse selection problem can affect the demand for auditing as well as management ownership. For example, a company may appoint a high-quality audit firm in order to reduce asymmetries in accounting information between managers and investors. Because adverse selection problems are more severe for smaller and younger companies, the auditor-choice model controls for size and age.

Extant research finds a positive relation between company size and audit firm size (e.g., Francis and Wilson 1988). One explanation for this is that large audit firms are able to audit large companies at lower average cost due to economies of scale. Company size is an important control variable because it is strongly correlated with both audit firm size and management ownership. I control for any nonlinearity between company size and audit firm size by sorting companies into 10 size deciles (based on total assets) and including a dummy variable for each decile.

### ***Monitoring by the board of directors***

Although monitoring by auditors is the main focus of this study, companies can improve board monitoring by appointing nonexecutive directors and by establishing audit and remuneration committees. Extant research indicates that monitoring by the board is correlated with the company's choice of audit firm. For example, Beasley and Petroni (2001) find an association between board independence and the appointment of audit firms that are brand name industry specialists. Ireland and Lennox (2001) find companies are more likely to appoint large audit firms when boards consist of more nonexecutive directors. Because monitoring by the board may be correlated with both ownership and audit firm size, it is important to include variables that capture board monitoring. The model includes the fraction of nonexecutive directors on the board (*NEX*), the existence of an audit committee (*AC*), and the existence of a remuneration committee (*REMC*).

### *Other determinants of auditor choice*

Prior research shows companies with subsidiaries located overseas are more likely to hire Big 5 audit firms, perhaps because the Big 5 have international offices that can audit overseas subsidiaries more efficiently than non-Big 5 firms (Ireland and Lennox 2002). The model includes a dummy variable indicating the existence of one or more overseas subsidiaries (*OSUBS*), and a positive coefficient is expected for *OSUBS*.

Extant auditor choice studies include leverage as an explanatory variable in order to test whether agency conflicts between shareholders and debtholders are associated with higher-quality auditing (e.g., Francis and Wilson 1988; DeFond 1992). These studies find mixed and weakly significant associations between leverage and audit firm size. Unfortunately, leverage poorly captures the agency conflict between shareholders and debt holders because it measures, with error, the existence of a debt covenant and how close the company is to violating the covenant (Watts and Zimmerman 1990; Fields, Lys, and Vincent 2001). UK companies do not disclose the existence or terms of debt covenants so, in common with previous studies, it is not possible to measure accurately the agency conflict between shareholders and debt holders. Leverage is included to retain comparability with extant research, but it is not interpreted as a test of agency theory. *LEV* is the ratio of long-term debt to total assets.

Some studies posit that companies require less monitoring when assets are mostly fixed (e.g., Himmelberg, Hubbard, and Palia 1999) because fixed capital assets are more observable and more easily monitored than “soft” capital. This is captured using a capital intensity variable (*CAPINT*), which is the ratio of fixed assets to total assets. If companies with high capital intensity are less likely to appoint high-quality audit firms the relation between *CAPINT* and audit firm size is expected to be negative. Table 1 summarizes the names and definitions for all variables.

## **4. The sample and descriptive statistics**

### *The sample*

All UK companies are required to file accounts with a central depository (Companies House), which means that data are publicly available for unlisted companies. Small unlisted companies are often closely held, so I sample large unlisted companies in order to increase variation in management ownership. I use the OneSource data base to identify unlisted companies with annual sales greater than £10 million. The sample includes only parent companies and independent companies because subsidiaries do not generally disclose ownership, and their choice of auditor is likely to be influenced by the parent company. Annual audits are mandatory for all sample companies even though they are unlisted (audits are mandatory for unlisted companies whose annual sales exceed £1 million). Company accounts are purchased online from Companies House and data are extracted by hand. The sample year is 2000, and 540 companies are in the sample, with one observation per company.

TABLE 1  
Variable names and definitions

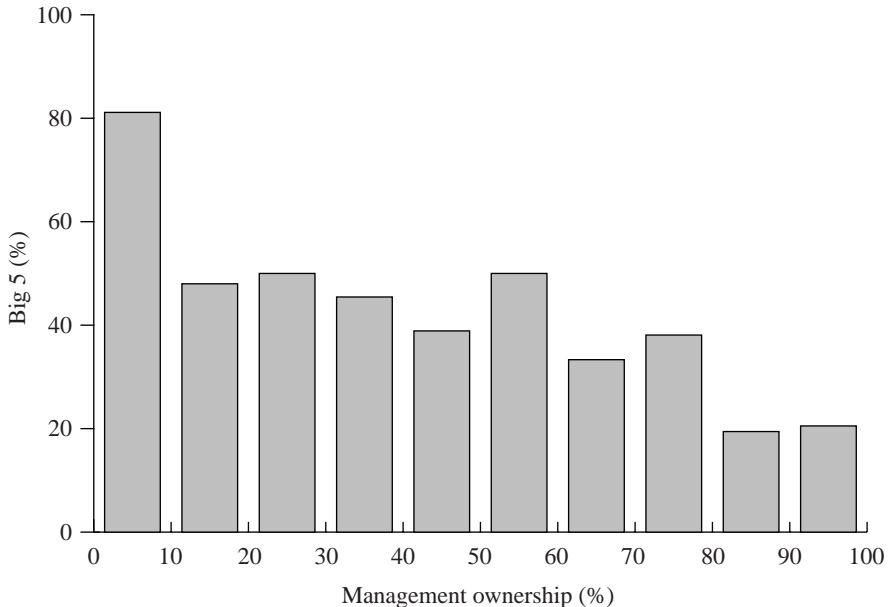
Variable name	Definition
<i>AUD</i>	= one if the audit firm is one of the Big 5; zero otherwise.
<i>MOWN</i>	= the beneficial ordinary shareholdings (percent) of executive directors.
<i>MOWN_LOW</i>	= <i>MOWN</i> if <i>MOWN</i> < L percent; L percent if <i>MOWN</i> ≥ L percent.
<i>MOWN_INTERM</i>	= zero if <i>MOWN</i> < L percent; <i>MOWN</i> minus L percent if L percent ≤ <i>MOWN</i> < H percent; H percent minus L percent if <i>MOWN</i> ≥ H percent.
<i>MOWN_HIGH</i>	= zero if <i>MOWN</i> < H percent; <i>MOWN</i> minus H percent if <i>MOWN</i> ≥ H percent.
<i>FREEC</i>	= (cash flow from operations – capital expenditure)/current assets.
<i>AGE</i>	= company's age (number of years since incorporation).
<i>PROFIT</i>	= net income/total assets.
<i>NEX</i>	= number of nonexecutive directors/number of directors.
<i>AC</i>	= one if the company has an audit committee; zero otherwise.
<i>REMC</i>	= one if the company has a remuneration committee; zero otherwise.
<i>LEV</i>	= long-term debt/total assets.
<i>OSUBS</i>	= one if the company has at least one overseas subsidiary; zero otherwise.
<i>CAPINT</i>	= tangible fixed assets/total assets.
<i>ASSET_DECILE_0</i>	= one if the ranked value of total assets lies in the lowest decile (0–10 percent); zero otherwise.
<i>ASSET_DECILE_1</i>	= one if the ranked value of total assets lies in the decile 10–20 percent; zero otherwise.
<i>ASSET_DECILE_2</i>	= one if the ranked value of total assets lies in the decile 20–30 percent; zero otherwise.
<i>ASSET_DECILE_3</i>	= one if the ranked value of total assets lies in the decile 30–40 percent; zero otherwise.
<i>ASSET_DECILE_4</i>	= one if the ranked value of total assets lies in the decile 40–50 percent; zero otherwise.
<i>ASSET_DECILE_5</i>	= one if the ranked value of total assets lies in the decile 50–60 percent; zero otherwise.
<i>ASSET_DECILE_6</i>	= one if the ranked value of total assets lies in the decile 60–70 percent; zero otherwise.
<i>ASSET_DECILE_7</i>	= one if the ranked value of total assets lies in the decile 70–80 percent; zero otherwise.
<i>ASSET_DECILE_8</i>	= one if the ranked value of total assets lies in the decile 80–90 percent; zero otherwise.
<i>ASSET_DECILE_9</i>	= one if the ranked value of total assets lies in the top decile (90–100 percent); zero otherwise.

**Descriptive statistics**

Figure 2 illustrates the univariate relation between management ownership and audit firm size. The frequency of Big 5 audits is 80 percent in the ownership region 0 to 10 percent, but it falls to around 50 percent in the ownership region 10 to 20 percent. The Big 5 frequency remains more or less constant as management ownership increases from 10 to 60 percent. It then drops to 20 percent as management ownership approaches 100 percent. The reductions in Big 5 frequency in the low and high regions of ownership are consistent with the hypothesized divergence-of-interests effect. The more or less constant Big 5 frequency in the intermediate region is consistent with an opposite entrenchment effect.

Table 2 reports means and medians for all variables after partitioning the sample into Big 5 and non-Big 5 clients. Consistent with Figure 2, management ownership (*MOWN*) is significantly lower for Big 5 clients compared with non-Big 5 clients. Within the sample as a whole, only 19 percent of boards have one or more nonexecutive directors, only 9 percent have an audit committee, and only 8 percent have a remuneration committee. Therefore, the majority of unlisted companies do not monitor management by establishing board committees or by appointing non-executive directors. However, Table 2 does indicate that companies are more likely to hire Big 5 auditors if the board performs a monitoring role. The fraction of non-executive directors (*NEX*) is 17 percent for Big 5 clients and only 3 percent for non-Big 5 clients. The frequency of audit committees (*AC*) is 18 percent for Big 5 clients and only 3 percent for non-Big 5 clients. The frequency of remuneration

**Figure 2** The univariate relation between audit firm size and management ownership



committees (*REMC*) is 17 percent for Big 5 clients and only 3 percent for non-Big 5 clients. Although these differences are statistically significant, it is important to note that the univariate tests do not control for company size.

The *LEV* and *OSUBS* variables indicate that Big 5 clients have higher leverage and are more likely to have overseas subsidiaries compared with non-Big 5 clients. The company size deciles demonstrate that Big 5 clients are significantly larger than non-Big 5 clients.

TABLE 2  
Mean and median values for Big 5 and non-Big 5 audit clients

	Mean values		Differ. in means	Median values		Differ. in medians
	Big 5 ( <i>AUD</i> = 1)	Non-Big 5 ( <i>AUD</i> = 0)		Big 5 ( <i>AUD</i> = 1)	Non-Big 5 ( <i>AUD</i> = 0)	
<i>MOWN</i>	41.94	78.29	-36.35*	32.53	95.38	-62.80*
<i>FREEC</i>	0.08	0.06	0.02	0.10	0.06	0.04‡
<i>AGE</i>	20.48	19.76	0.72	12.00	14.00	-2.00
<i>PROFIT</i>	0.05	0.19	-0.14‡	0.06	0.08	-0.02‡
<i>NEX</i>	0.17	0.03	0.14*	0.00	0.00	0.00*
<i>AC</i>	0.18	0.03	0.15*	0.00	0.00	0.00*
<i>REMC</i>	0.17	0.03	0.14*	0.00	0.00	0.00*
<i>LEV</i>	0.18	0.10	0.08*	0.08	0.04	0.04*
<i>OSUBS</i>	0.37	0.17	0.20*	0.00	0.00	0.00*
<i>CAPINT</i>	0.30	0.27	0.03	0.27	0.19	0.08*
<i>ASSET_DECILE_0</i>	0.02	0.15	-0.13*	0.00	0.00	0.00*
<i>ASSET_DECILE_1</i>	0.06	0.12	-0.06†	0.00	0.00	0.00†
<i>ASSET_DECILE_2</i>	0.05	0.13	-0.08*	0.00	0.00	0.00*
<i>ASSET_DECILE_3</i>	0.08	0.11	-0.03	0.00	0.00	0.00
<i>ASSET_DECILE_4</i>	0.08	0.12	-0.04	0.00	0.00	0.00
<i>ASSET_DECILE_5</i>	0.07	0.12	-0.05‡	0.00	0.00	0.00‡
<i>ASSET_DECILE_6</i>	0.13	0.08	0.05†	0.00	0.00	0.00‡
<i>ASSET_DECILE_7</i>	0.12	0.09	0.03	0.00	0.00	0.00
<i>ASSET_DECILE_8</i>	0.17	0.05	0.12*	0.00	0.00	0.00*
<i>ASSET_DECILE_9</i>	0.22	0.02	0.20*	0.00	0.00	0.00*
Observations	211	329		211	329	

**Notes:**

See Table 1 for variable definitions.

Differences in means are tested using *t*-statistics. The median tests are based on whether the two samples are drawn from populations with the same median (using Pearson chi-square statistics).

- \* Significant at the 1 percent level (two-tailed test).
- † Significant at the 5 percent level (two-tailed test).
- ‡ Significant at the 10 percent level (two-tailed test).

## 5. Multivariate results

Table 3 reports multivariate results for the auditor choice model. Columns (1)–(4) estimate the piece-wise linear functional form (equation 1) and column 5 estimates the curvilinear functional form (equation (2)). Column 1 uses the 5 and 25 percent ownership thresholds found in Morck et al. 1988. The coefficient for the low ownership region is negative and statistically significant at the 10 percent level (two-tailed). The coefficient for the high ownership region is negative and statistically significant at the 5 percent level (two-tailed). These results are consistent with a dominant divergence-of-interests effect within low and high regions of management ownership ( $\alpha_1 < 0$  and  $\alpha_3 < 0$ ). In other words, companies are more likely to appoint high-quality audit firms as management ownership falls within these regions. The coefficient for the intermediate ownership region is completely insignificant. This suggests that neither the divergence-of-interests effect nor the entrenchment effect dominates within the intermediate region of ownership.

Short and Keasey (1999) argue that the entrenchment region is higher in the United Kingdom than in the United States, in which case the thresholds of 5 and 25 percent in column 1 are inappropriate. Columns 2 to 4 therefore use higher ownership thresholds: column 2 uses 10 and 40 percent, column 3 uses 10 and 50 percent, and column 4 uses 15 and 50 percent. The evidence supports their argument that the entrenchment region is relatively high in the United Kingdom. The negative coefficients for *MOWN\_LOW* and *MOWN\_HIGH* are statistically significant at better than the 1 percent level (two-tailed), and the *MOWN\_INTERM* coefficients are positive but insignificant.

Column 5 provides results using the curvilinear functional form. As expected, the coefficient for ownership is negative (significant at the 1 percent level), the coefficient for ownership squared is positive (significant at the 5 percent level), and the coefficient for ownership cubed is negative (significant at the 10 percent level). Figure 3 uses the coefficient estimates in column 5 to graph the curvilinear relation between management ownership and the predicted probability that a “representative company” will appoint a Big 5 firm. The representative company is assumed to have mean values for all explanatory variables except ownership.<sup>4</sup> Figure 3 illustrates that the likelihood of hiring a Big 5 audit firm decreases as ownership increases within low regions of ownership and within high regions of ownership. At intermediate levels of ownership, the association is flatter and slightly positive. Figure 3 also shows that the association between management ownership and audit firm size is economically significant as well as statistically significant. For example, the likelihood of employing a Big 5 firm falls from 70 to 45 percent as management ownership increases from 0 to 15 percent.

### Further tests

First, I investigate why this study finds a significant and robust relation between management ownership and audit firm size, whereas prior studies do not. An important difference between this study and prior research is the sampling of unlisted companies. Another important difference is that this study samples UK companies whereas prior studies sample U.S. companies. Clarkson and Simunic



TABLE 3

Multivariate results for the association between audit firm size and management ownership (z-statistics reported in parentheses)

$$AUD = \alpha_1 MOWN\_LOW + \alpha_2 MOWN\_INTERM + \alpha_3 MOWN\_HIGH + CONTROLS + u \quad (1)$$

$$AUD = \beta_1 MOWN + \beta_2 MOWN^2 + \beta_3 MOWN^3 + CONTROLS + u \quad (2)$$

	(1)	(2)	(3)	(4)	(5)
<i>MOWN_LOW</i>	-0.20 <sup>‡</sup> (-1.66)	-0.15* (-2.77)	-0.15* (-2.90)	-0.13* (-3.27)	
<i>MOWN_INTERM</i>	-0.01 (-0.46)	0.01 (0.58)	0.01 (0.48)	0.02 (1.21)	
<i>MOWN_HIGH</i>	-0.01 <sup>†</sup> (-2.26)	-0.02* (-2.68)	-0.02* (-2.61)	-0.02* (-2.82)	
<i>MOWN</i>					-0.09* (-2.57)
<i>MOWN</i> <sup>2</sup>					0.16 × 10 <sup>-2</sup> <sup>†</sup> (2.01)
<i>MOWN</i> <sup>3</sup>					-0.98 × 10 <sup>-5</sup> <sup>‡</sup> (-1.94)
<i>FREEC</i>	0.14 (0.91)	0.14 (0.87)	0.13 (0.83)	0.12 (0.81)	0.13 (0.91)
<i>AGE</i>	-0.01 (-1.07)	-0.01 (-1.15)	-0.01 (-1.14)	-0.01 (-1.15)	-0.01 (-1.01)
<i>PROFIT</i>	-1.05 (-1.48)	-1.04 (-1.45)	-1.03 (-1.44)	-1.03 (-1.44)	-1.02 (-1.45)
<i>NEX</i>	2.09 <sup>†</sup> (2.19)	2.04 <sup>†</sup> (2.18)	2.05 <sup>†</sup> (2.19)	2.18 <sup>†</sup> (2.34)	2.09 <sup>†</sup> (2.19)
<i>AC</i>	0.01 (0.01)	0.10 (0.07)	0.08 (0.05)	-0.00 (-0.00)	0.03 (0.02)
<i>REMC</i>	-0.53 (-0.30)	-0.57 (-0.34)	-0.53 (-0.31)	-0.50 (-0.29)	-0.58 (-0.32)
<i>LEV</i>	0.08 (0.18)	0.07 (0.16)	0.05 (0.15)	0.01 (0.02)	0.02 (0.05)
<i>OSUBS</i>	0.41 (1.61)	0.41 (1.62)	0.41 (1.61)	0.39 (1.53)	0.38 (1.51)
<i>CAPINT</i>	-0.16 (-0.38)	-0.15 (-0.37)	-0.14 (-0.34)	-0.09 (-0.24)	-0.13 (-0.35)
<i>ASSET_DECILE_0</i>	-0.58 (-0.89)	-0.60 (-0.92)	-0.59 (-0.91)	-0.57 (-0.88)	-0.68 (-1.07)
<i>ASSET_DECILE_1</i>	0.88 (1.60)	0.89 (1.63)	0.88 (1.61)	0.91 (1.65)	0.77 (1.45)

(The table is continued on the next page.)

TABLE 3 (Continued)

	(1)	(2)	(3)	(4)	(5)
<i>ASSET_DECILE_2</i>	0.27 (0.39)	0.28 (0.41)	0.25 (0.37)	0.27 (0.39)	0.12 (0.18)
<i>ASSET_DECILE_3</i>	1.43* (2.64)	1.47* (2.69)	1.47* (2.69)	1.51* (2.77)	1.33† (2.54)
<i>ASSET_DECILE_4</i>	1.15† (2.05)	1.21† (2.17)	1.21† (2.17)	1.25† (2.26)	0.98‡ (1.82)
<i>ASSET_DECILE_5</i>	1.06‡ (1.79)	1.08‡ (1.83)	1.07‡ (1.81)	1.08‡ (1.84)	0.88 (1.56)
<i>ASSET_DECILE_6</i>	1.93* (3.59)	1.96* (3.66)	1.96* (3.68)	2.02* (3.75)	1.83* (3.49)
<i>ASSET_DECILE_7</i>	1.66* (2.83)	1.67* (2.88)	1.64* (2.84)	1.67* (2.88)	1.49* (2.69)
<i>ASSET_DECILE_8</i>	2.10* (3.80)	2.15* (3.84)	2.15* (3.84)	2.18* (3.89)	2.01* (3.79)
<i>ASSET_DECILE_9</i>	2.53* (3.74)	2.57* (3.82)	2.54* (3.79)	2.56* (3.83)	2.41* (3.72)
Industry dummies included?	Yes	Yes	Yes	Yes	Yes
Pseudo $R^2$	29.7%	29.9%	30.0%	30.3%	29.7%

**Notes:**

See Table 1 for variable definitions.

In column (1), the low ownership region is 0–5%, the intermediate ownership region is 5–25%, and the high ownership region is 25–100%.

In column (2), the low ownership region is 0–10%, the intermediate ownership region is 10–40%, and the high ownership region is 40–100%.

In column (3), the low ownership region is 0–10%, the intermediate ownership region is 10–50%, and the high ownership region is 50–100%.

In column (4), the low ownership region is 0–15%, the intermediate ownership region is 15–50%, and the high ownership region is 50–100%.

Column (5) is estimated using a curvilinear functional form rather than a piece-wise linear functional form.

The models are estimated using logit with robust standard errors. Industry dummies are included for each two-digit SIC sector that has 10 or more companies.

\* Significant at the 1 percent level (two-tailed test).

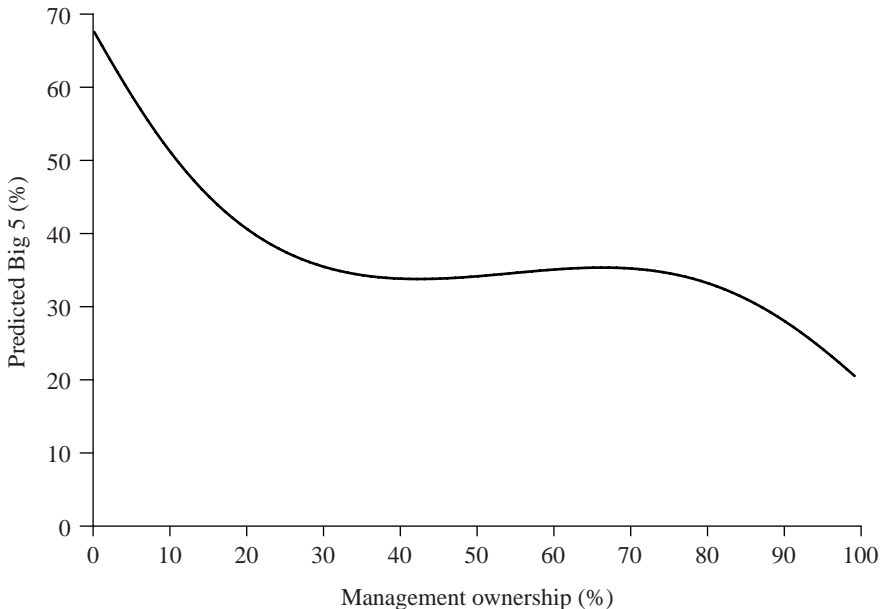
† Significant at the 5 percent level (two-tailed test).

‡ Significant at the 10 percent level (two-tailed test).

(1994) argue that the litigation threat deters large U.S. audit firms from supplying audits to companies that have agency problems. Their findings imply that the litigation effect can confound the agency-related association between management ownership and audit firm size. Because the United Kingdom is less litigious for audit firms than the United States (Gul, Lyn, and Seetharaman 2002), the lower litigation threat could explain why results are different in this study. These alternative explanations are investigated by estimating the same auditor choice model for listed UK companies. If sampling unlisted companies is the most important difference between this study and prior research, the association between management ownership and audit firm size is expected to be insignificant for listed companies. If sampling UK companies is the most important difference between this study and prior research, the association is expected to be significant for both listed and unlisted companies. In untabulated results, none of the ownership variables are significant in explaining auditor choice for listed UK companies. This does not indicate that the results are attributable to differences between the United Kingdom and the United States. Rather, it appears that the results differ from prior research because this study samples unlisted companies.

Second, I investigate whether the monitoring value of auditing varies with monitoring by the board of directors. Unfortunately, theory does not predict whether auditing and the board of directors are substitute or complementary monitoring mechanisms. For example, if high-quality audits and the board of directors

**Figure 3** The estimated curvilinear relation between management ownership and audit firm size (the relation is drawn using the coefficient estimates reported in column (5) of Table 3)



are substitutes, the association between ownership and audit firm size is expected to be weaker when companies have nonexecutive directors. On the other hand, if high-quality audits and the board of directors are complements, the association is expected to be stronger when companies have nonexecutive directors. I investigate whether auditing and the board of directors are substitutes or complements by reestimating the auditor choice model after partitioning the sample into two groups. Group 1 consists of 439 companies with no nonexecutive directors on the board. Group 2 consists of 101 companies with at least one nonexecutive director. Because the sample is small in group 2, I estimate a more parsimonious model by dropping control variables that are insignificant in Table 3 and by replacing the company size deciles with a single size variable (the log of total assets). Untabulated results provide no evidence that the ownership coefficients are different between groups 1 and 2. For example, in the low region (0 to 15 percent), the ownership coefficients are  $-0.11$  in group 1 and  $-0.12$  in group 2. In the high region (50 to 100 percent), the ownership coefficients are  $-0.02$  in group 1 and  $-0.02$  in group 2. These findings do not support the view that auditing and the board of directors are strong substitutes or complements.

Third, I examine whether the monitoring value of auditing varies with debt levels and operating cash flows. Anderson, Francis, and Stokes (1993) find that auditing is less important in companies that have high-value growth options (these companies have low levels of debt and little operating cash flow). I reestimate the auditor choice model after partitioning the sample by median debt levels and by median operating cash flows.<sup>5</sup> The untabulated results provide no evidence that the monitoring value of auditing varies between these subsamples. This may be because most sample companies are mature and do not have high-value growth options (the average values of leverage, net operating cash flows, and company age are 13.2 percent, £7.8 million, and 20 years).

Fourth, I investigate whether there is an endogeneity problem for management ownership. I first estimate an ordinary least squares (OLS) model with ownership as the dependent variable, and I use the coefficient estimates to obtain the predicted level of ownership (*MOWN\_HAT*). Untabulated results indicate company size is the most determinant of management ownership (larger companies have lower levels of ownership) and the ownership model has a high  $R^2$  (82.0 percent). Unfortunately, despite its high  $R^2$ , the model does not accurately classify observations within the low, intermediate, and high ownership regions. For example, the minimum, mean, and maximum values of *MOWN\_HAT* are  $-15.46$ ,  $41.22$ , and  $87.74$  percent when *MOWN* lies between 0 and 5 percent. Because of this inaccurate classification, I do not test whether the relation between *MOWN\_HAT* and audit firm size is nonlinear. However, I do test whether the relation between *MOWN\_HAT* and audit firm size is negative. The auditor choice model is estimated using *MOWN\_HAT* instead of the piece-wise linear and curvilinear ownership variables.<sup>6</sup> The *MOWN\_HAT* coefficient is  $-0.02$  and significant at the 1 percent level ( $z$ -statistic =  $-5.28$ ). To compare the *MOWN\_HAT* and *MOWN* coefficients, I replace *MOWN\_HAT* with the actual level of management ownership (*MOWN*). The *MOWN* coefficient is  $-0.02$  and is significant at the 1 percent level

( $z$ -statistic =  $-7.74$ ). Because the results for *MOWN\_HAT* and *MOWN* are very similar, the negative relation between management ownership and audit firm size is robust to controlling for the endogeneity of management ownership. I also reestimate the ownership and auditor choice models after dropping the governance variables (*NEX*, *AC*, *REMC*) because of concerns that these variables may be endogenous. In this case, the *MOWN\_HAT* coefficient is  $-0.02$  and significant at the 1 percent level ( $z$ -statistic =  $-5.18$ ) and the *MOWN* coefficient is also  $-0.02$  and significant at the 1 percent level ( $z$ -statistic =  $-8.17$ ). The results for *MOWN* and *MOWN\_HAT* are therefore very similar.

## 6. Conclusion

Management incentives are fully aligned with shareholder interests when managers own 100 percent of the equity, but this ownership structure is not suitable for most large corporations. The resulting separation of ownership from control creates two agency problems. When managers have small shareholdings there is a divergence-of-interests problem, and when managers have concentrated shareholdings there is an entrenchment problem. These agency problems imply that outside shareholders and managers have incentives to write contracts that deter management opportunism. These contracts create a demand for high-quality auditors who attest to the fairness of financial statements.

This paper tests the association between management ownership and audit firm size using a sample of unlisted companies. I expect unlisted companies provide a relatively powerful test of agency theory for two reasons. First, unlisted companies are not subject to monitoring by a stock market, so the monitoring value of auditing may be greater than for listed companies. Second, there is considerable variation in management ownership within unlisted companies, whereas management ownership is typically low in listed companies.

The relation between management ownership and audit firm size is found to be highly nonlinear. Within low and high regions of ownership, there are significant negative associations between management ownership and audit firm size. Therefore, the likelihood of employing a large audit firm is lower as management ownership increases within these two regions. This is consistent with a dominant divergence-of-interests effect within the low and high regions of management ownership. Within intermediate regions of ownership, the association between management ownership and audit firm size is flatter and slightly positive. This is consistent with an entrenchment effect fully offsetting the divergence-of-interests effect within intermediate regions of ownership. In conclusion, the evidence supports the view that auditing has a valuable monitoring role in unlisted companies.

## Endnotes

1. For example, consider a related party transaction that transfers \$1 million from a public company to an entity wholly owned by the manager. If the manager owns 50 percent of the public company his net personal gain is only \$500,000, whereas if he owns 5 percent his net gain is \$950,000. The manager's return from behaving opportunistically is therefore greater when the manager has smaller shareholdings.

2. This prediction does not rest on any assumption about whether audit firms are appointed directly by management or by outside shareholders (or by their representatives such as the board of directors and audit committee). Both outside shareholders and management have incentives to employ high-quality auditors in order to reduce the potential for management opportunism. Using low-quality auditors can impose agency costs on management in the form of lower compensation and restricted access to external finance. Therefore, managers have incentives to appoint high-quality auditors in order to bond themselves to outside shareholders. Using low-quality auditors can impose agency costs on outside shareholders in the form of increased management opportunism, so outside shareholders also have incentives to appoint high-quality auditors.
3. Pagano et al. (1998) confirm that management ownership is smaller in large companies, but they are unable to test the association between ownership and age due to lack of data.
4. If the control variables are evaluated at other than their means, the curve in Figure 3 is simply shifted up or down. The values of the control variables affect only the intercept of the curve, not the shape of the curve.
5. Anderson et al. (1993) capture growth options using a book-to-market variable that does not exist for unlisted companies.
6. To identify the *MOWN\_HAT* coefficient, the auditor choice model must omit at least one variable that is included in the ownership model. I omit the variables found to be insignificant in Table 3.

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