The Use of Audit Partner Expertise as a Risk Management Strategy

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ABSTRACT: Audit firms use risk management strategies to mitigate client risks, which could result in incurring a loss on an engagement, due to for example litigation, loss of reputation or regulatory penalties. This paper examines one of the risk management strategies that an audit firm can adopt: the use of audit partner expertise.

This study contributes to the literature by examining the actual use of audit partner expertise as a risk management strategy. To this end, the study uses data from the Belgian audit market, which allows construction of complete client portfolios for all audit firms in the market.

Using three hypotheses, this study examines whether audit firms use audit partner expertise as a risk management strategy for three different types of risk: audit risk, client business risk and auditor business risk.

Results support the hypotheses that audit partner expertise is used as a risk management strategy for clients who pose a higher audit risk or a higher auditor business risk. No evidence is found in support of the hypothesis that audit partners with higher expertise are allocated to engagements with a higher client business risk.

Key Words: *Risk Management Strategies, Audit Partner Expertise, Partner Allocation.*

Acknowledgements: This paper benefited from comments by the participants at the 2007 EARNet Doctoral Colloquium in Aarhus, the 2008 EAA Doctoral Colloquium in Rotterdam, and workshop participants at Maastricht University.

1. Introduction

Audit firms use risk management strategies to reduce the impact of client risks. While there are various risk management strategies which an audit firm can use, this study examines whether audit firms use partner expertise as a risk management strategy. Auditors with more expertise can be expected to perform better at detecting material misstatements, and subsequently in acting upon any detected material misstatements.

Assuming audit firms participate in a competitive market and given a scarcity of expert staff, audit firms will face a cost minimization problem not only at the individual engagement level (e.g. O'Keefe et al. 1994), but also at the overall firm level. Even though clients with a low risk are expected to benefit from having an experienced engagement partner, it is optimal for audit firms to assign partners with the highest expertise to clients with greater risks, since the audit process of such clients is expected to benefit most from more partner expertise. The assessment of client risk factors will therefore not only influence the assignment of labor within, but also across engagements (Bell et al. 1997). The diversity in knowledge of audit partners, and the fact that client characteristics show a lot of variation, makes the allocation of audit partners to clients a complex, but important task (Dopuch et al., 2003).

The engagement partner is the leader of the audit team conducting the audit and bears final responsibility in case of an audit failure. Because audit partners are personally accountable for any liabilities arising from engagements for which they are the engagement partner, they are likely to be reluctant to audit risky clients, possibly resulting in a less than optimal use of expertise as a risk management strategy.[1] This may leave audit firms with risks that are insufficiently, or cost ineffectively managed.

Because of the regulatory requirement to effectively manage client risks (e.g. ISA 220.19, AU. 312.02) and the impact of risk management on firm profitability and risk exposure, it is important to test whether firms actually allocate the audit partners with the greatest expertise to those clients which pose an increased risk. Therefore, the main research question of this study is: Do audit firms use audit partner expertise as a risk management strategy by allocating partners with more expertise to clients with a higher risk?

Whereas prior literature has tested how expertise contributes to the effectiveness and efficiency of audit decisions (e.g. Libby and Frederick 1990, Biggs et al. 1988, Bedard and

[1] Years of experience is often argued to be the main driver of expertise (Hamilton and Wright 1982), but seniority is also a main factor in promotion decisions within audit firms. Partners with the greatest expertise may therefore use their power within the firm to influence the client allocation process.

Biggs 1991), examined the nature and mix of labor resources used within a single firm (e.g. O'Keefe et al. 1994; Hackenbrack and Knechel 1997) or tested the effect of risk on the planned allocation of expert personnel (e.g. Johnstone and Bedard 2003; Bedard and Johnstone 2004), no study has tested whether audit firms take client risks into account in partner allocation decisions. The current study contributes to prior literature by examining the actual allocation of audit partners across clients in a market wide setting.

This study will be conducted in the Belgian audit market, a setting in which it is possible to construct complete client portfolios of each audit firm. Furthermore, for each audit firm it is possible to construct measures expertise for all of its audit partners. To reduce the impact of other potential risk management strategies, this study makes use of a sample of companies for which a new partner was assigned, while continuing to be audited by the same audit firm. This makes it possible to test whether clients which pose greater risks are audited by audit partners with a greater level of expertise.

The current study tests the use of partner expertise as a risk management strategy for three types which of commonly distinguished in auditing literature: audit risk, client business risk and auditor business risk (Huss and Jacobs 1991). The results support the expectation that audit firms use partner expertise as a risk management strategy. Partners with greater expertise are allocated to clients with greater audit risk or greater auditor business risk, but no support is found for the use of partner expertise as a risk management strategy for client business risk.

The next section discusses relevant prior literature and the hypotheses development. The third section describes the data required to conduct the current study and outlines the research methodology. Section four presents the results of the analyses. Finally, section 5 provides the conclusion and limitations.

2. Prior Literature and Hypotheses Development

This section provides an overview of relevant prior literature. First, I discuss why risk management strategies are important to audit firms. Second, I describe possible risk management strategies, followed by an overview of prior research that focused on how audit firms respond to client risks. Finally, based on this discussion, I will outline the hypotheses for this study.

Importance of Risk Management Strategies

Because a single client, in case of bankruptcy or an audit failure, can cause significant costs to an audit firm, it is important for an audit firm to reduce the risk of its clients to an acceptable level, while taking into account the audit fee (e.g. Johnstone and Bedard 2003), and the risk characteristics of existing clients (Simunic and Stein 1990).

Prior literature has identified various types of risks which clients can pose to auditors, using different risk classifications. In the current paper, I use the commonly used risk classification provided by Huss and Jacobs (1991). They distinguish three types of risk that are relevant for audit firms in client acceptance decisions and for the audit process in general: client business risk, audit risk, and auditor business risk. The first risk, client business risk, is related to client profitability and continuity. Client business risk is defined as "the risk that an entity's business objectives will not be attained" (Bell et al. 1997). Audit risk refers to "the risk that the auditor may unknowingly fail to appropriately modify his or her opinion on financial statements that are materially misstated" (AICPA 2006, AU. 312.02). Auditor business risk relates to the risk of loss on an engagement either due to litigation, loss of reputation or failure to realize fees (Huss and Jacobs 1991; Johnstone 2000).

Auditing standards require that audit firms should appoint audit teams to engagements in a way that an audit team has a sufficient amount of experience to conduct the audit in accordance with professional, regulatory and legal requirements. The International Standards on Auditing (ISA 220.19) require that "*[t]he engagement partner should be satisfied that the engagement team collectively has the appropriate capabilities, competence and time to perform the audit engagement in accordance with professional standards and regulatory and legal requirements, and to enable an auditor's report that is appropriate in the circumstances to be issued*". ISA 220.20 draws further attention to the experience component of an engagement team, requiring that an engagement team has: "*[a]n understanding of, and practical experience with, audit engagements of a similar nature and complexity through appropriate training and participation*".

According to the audit risk model (AICPA 2006, AU. 312.02), audit risk is a function of the risk of material misstatements and the detection risk, where the risk of material misstatements is the product of inherent risk and control risk. Inherent risk is the probability that the financial statements contain a material misstatement before the audit has been conducted (Simunic and Stein 1996). Control risk refers to the risk that material misstatements are not detected by the client's internal control system. Detection risk refers to the probability that the auditor fails to detect a material misstatement, not detected by the

client's internal control system. From this it follows that in cases of increased inherent risk and increased control risk (weaker internal control system) an auditor will have to lower the detection risk (more audit effort) to maintain audit risk at an acceptable level (e.g. Simunic 1980). When the audit risk is low, a higher degree of detection risk could be allowed (i.e. less audit effort is required). Hence, from the audit risk model it follows that an audit firm has to appropriately adjust its audit plans based on the degree of audit risk.

Apart from merely reducing client risk, it is also important that an audit firm manages client risk in a cost effective manner. Standard micro economic theory predicts that companies operating in a competitive market aim at minimizing production costs, given a certain level of output. O'Keefe et al. (1994) apply the argument of cost minimization to the audit production function. They argue that the level of assurance of an audit engagement is dependent upon client characteristics (which are argued to be exogenous from an auditor's perspective) and the service inputs by the auditor. Following their assumption that the level of assurance is related to brand name reputation and therefore constant across a firm's clients, the quantity of required production factors is a function of client characteristics. They argue that audit firms will minimize the audit production costs, given client characteristics.

The use of risk management strategies

Audit firms use a number of strategies to mitigate client risks (Francis and Krishnan 1999; Johnstone and Bedard 2003), such as increasing audit effort, screening out clients with a high litigation risk (Francis and Reynolds 2001; Shu 2000; Choi et al. 2004) or poor management integrity (Johnstone and Bedard 2004, Asare et al. 2005), charging a risk premium (e.g. Pratt and Stice 1994, Houston et al. 1999, Seetharaman et al. 2002, Johnstone and Bedard 2003, Asare et al. 2005), negotiating adjustments of the financial statements with the clients, as well as more conservative reporting (i.e. lowering the threshold for issuing a modified audit report). Risks can also be mitigated by changing the nature and timing of audit procedures (Bell et al. 2002).

The use of expert personnel as a risk management strategy is supported by O'Keefe et al. (1994), Hackenbrack and Knechel (1997), Johnstone and Bedard (2001), Johnstone and Bedard (2003), and Asare et al. (2005). In this study I focus on the allocation of partners with more expertise as a risk management strategy. Prior research has underlined the importance of staffing decisions in the reduction of client risk (Johnstone and Bedard 2003).

A number of studies use an experimental approach to test the effect of expertise on the effectiveness of conducting an audit (e.g. Libby and Frederick 1990; Biggs et al. 1988;

Bedard and Biggs 1991). Libby and Frederick (1990) find evidence suggesting that experienced auditors are more accurate and more efficient in explaining audit findings and that they are able to provide more plausible reasons for audit findings compared to less experienced auditors (measured in years of auditing experience). Using the verbal protocol technique, Biggs et al. (1988) and Bedard and Biggs (1991) report similar findings using an experience classification based on rank (seniors relative to managers). Bedard and Biggs (1991) further report that while inexperienced auditors respond to finding a potential problem by increasing audit effort on all steps, experienced auditors seem to be more selective, suggesting a more cost effective approach towards handling audit problems. These studies add to the understanding why it would be beneficial for an audit firm to allocate more experienced personnel to clients based on the risk profile of the client and the level of expertise of the partner.

The first insights into how audit firms alter audit plans based on client characteristics are provided by Bedard (1989). Her study shows that audit plans remain relatively unchanged from year to year.[2] Mock and Wright (1993) find evidence confirming the results by Bedard (1989), and add that the extent of planned testing is found to be positively and significantly related to account-specific risk factors but not to engagement-wide risk factors. Quadackers et al. (1996) show that the planned extent of substantive testing is only adjusted for clients who exhibited large changes in risk. Mock and Wright (1999) also find a weak association between the changes in client risks and the amount of testing, but they report a moderate positive association between changes in client risk factors and the nature of planned tests. Davidson and Gist (1996) report that the total number of audit hours is positively related to inherent risk, control risk, client business risk, client size, and client complexity.

A number of studies add to the literature by disaggregating the number of hours spent across different levels of expertise. O'Keefe et al. (1994) find that more hours of expert staff are assigned to clients with a higher client business risk, but find no support for the hypothesis that the level of inherent risk has an effect on the number of hours spent on an engagement by managers or partners. Hackenbrack and Knechel (1997) add to this by showing that audit firms allocate relatively more hours of high grades of labor to clients with a higher auditor business risk. Johnstone and Bedard (2001) report that audit firms allocate personnel with a

[2] Reductions in the extent of testing are indicated to be mainly driven by either an improvement in the client's internal control system or favorable results from the prior year's audit. Reasons for increases in the extent of testing are more varied, such as: changes in the client environment, a poor quality of client-prepared data, detected problems during initial testing or analytical procedures, and concerns about obsolescence or a cut-off problems.

greater level of expertise to clients with a higher audit risk. Johnstone and Bedard (2003) conclude that audit firms use experienced personnel to mitigate audit risk and auditor business risk, but find no evidence supporting the argument that audit firms use expert personnel to mitigate client business risk. Results from an experimental design by Asare et al. (2005) show that audit firms allocate relatively more experienced staff to clients with a high inherent risk.

Overall, prior literature has found a weak association between client risk factors and the number of audit hours planned to an engagement. Stronger results are found when taking the level of staff expertise into account, although it still remains unclear for which types of risk the use of partner expertise is an appropriate risk management strategy. Building on prior literature, I will examine the use of partner expertise as a risk management strategy for each of the risk categories.

Hypotheses Development

The prior discussion shows mixed results regarding the question for which types of risks audit firms use expertise as a risk management strategy. Since the viability of the use of expert personnel as a risk management strategy is likely to depend on the type of risk (as suggested by Johnstone and Bedard (2003)), and because of the mixed evidence so far, I will formulate separate hypotheses for the three risk categories as identified by Huss and Jacobs (1991): audit risk, auditor business risk, and client business risk.

The first hypothesis tests whether audit firms use partner expertise as a risk management strategy for audit risk.

H1: Ceteris paribus, audit firms are more likely to allocate a partner with more expertise to a client who poses a higher audit risk than to a client who poses a lower audit risk.

The second hypothesis examines whether audit firms use partner expertise as a risk management strategy to mitigate client business risk.

H2: Ceteris paribus, audit firms are more likely to allocate a partner with more expertise to a client who poses a higher client business risk than to a client who poses a lower client business risk.

The final hypothesis examines the use of audit partner expertise as a risk management strategy for clients with a higher auditor business risk:

H3: Ceteris paribus, audit firms are more likely to allocate a partner with more expertise to a client who poses a higher auditor business risk than to a client who poses a lower auditor business risk.

3. Methodology

In this section I describe the methodology used to test the hypotheses stated in the previous section. First, I describe the data requirements for testing the research question. Second, I explain why the Belgian audit market has been chosen as a setting for this research, followed by a description of characteristics specific to this audit market. Third, the sample selection is discussed. I conclude this section by providing an overview of variables which are used to measure audit partner expertise and client characteristics.

Data

To be able to test the hypotheses as stated in the previous section, there are a number of data requirements. First of all, client financial information is required so that it is possible to construct proxies for the client risk factors. Second, for every client company in the sample the audit firm should be known, because complete client portfolios per firm have to be constructed. This is necessary to compare the risk profile of one client to that of the risk profiles of the remaining clients of the same audit firm, so that it is possible to test whether audit firms allocate partners with relatively more expertise to relatively riskier clients. Third, the name of the audit partner should be known for every engagement. Finally, it is required that a measure of audit partner expertise can be estimated for each auditor in the market. The last two requirements are necessary to be able to relate a client's risk profile to the expertise of an audit partner.

The Belgian audit market provides an appropriate setting for this research for a number of reasons. First of all, in Belgium audit reports have to be signed with both the name of the audit firm as well as the name of the responsible audit partner. This makes it possible to construct client portfolios at both the firm and the partner level. Second, all auditors in Belgium are required to be registered at the Belgian Institute of Auditors (IBR, 'Instituut van de Bedrijfsrevisoren'). The Belgian Institute of Auditors has published annual membership lists from 1961 until 2006. These membership lists allow calculating the years of experience

of each auditor in Belgium.[3] Appendix A gives a more extensive overview of the IBR membership lists and steps taken to match audit partners to the appropriate audit firm. In addition to this, the possibility to construct client portfolios at the partner level provides the opportunity to construct an alternative measure of expertise, which is industry expertise.

Finally, it is possible to collect the required financial information for all Belgian companies using the Bel-First database. With this financial data it is possible to construct proxies for audit risk, client business risk and auditor business risk for each audited company.

The possibility to construct complete portfolios per firm and per partner, to measure expertise, and to construct risk proxies for every audited company make the Belgian audit market a unique and appropriate setting to examine the use of partner expertise as a risk management strategy.

The Belgian audit market

In many ways the Belgian market for audit services is different from the US setting. Belgium has a code-law tradition, a French legal origin, a strong legal enforcement, a high ownership concentration, but low outside investor rights and a stock market which is of limited importance (Leuz et al 2003, LaPorta et al. 1997, LaPorta et al. 1998, Vander Bauwhede and Willekens 2004).[4] Most of the companies in Belgium are privately held and family-owned. Further, Belgium is a country with a low litigious environment, in which hardly any litigation exists against impropriate audit reporting (Gaeremynck and Willekens 2003).

Although Belgium has a low litigious environment, there are still sufficient other mechanisms that make sure that the audit quality remains at a sufficiently high level, e.g. three year mandates, disciplinary actions against auditors, investigations in audit firms, and peer reviews (Gaeremynck and Willekens 2003). In addition, even though the risk of litigation is low, auditors still face the risk of loss of reputation (Klein and Leffler 1981) and loss of quasi rents (DeAngelo 1981).

Figure 1 gives an overview of the development of the Belgian audit market. It shows a steady increase in the number of auditors, which stabilized around 1998 at just below 1,000

[3] The number of auditors registered at the Belgian Institute of Auditors varies from 980 auditors in 1999 to 989 auditors in 2006. In 2000 the number of registered auditors was the highest, with 1002 auditors at the end of the year.

[4] Vander Bauwhede and Willekens (2004) show that the amount of listed companies is small (150) relative to the number of companies that file their financial statements at the National Bank of Belgium (250.000), relative to the number of inhabitants (in contrast to the UK and the US).

auditors. The major increase in the number of auditors around 1984 was due to a change in regulation, requiring all auditors to be registered with the national institute of auditors (IBR).

<Insert Figure 1 about here>

Sample selection

As discussed, data for this study are collected from two separate sources. Financial data are collected using the Bel-First database, and partner information was collected using the IBR membership lists. First, financial data and auditor information (i.e. the name of the audit firm and the audit partner) were first available for the complete audit market for the 1998 fiscal year. Second, partner experience was measured using the membership lists of the Belgian institute of auditors, which were published annually from 1961 until 2006. Therefore the sample is limited to company observations for the years 1998-2006. In this section I will discuss the sample selection. More information about the steps taken to prepare the data for this research can be found in the appendix.

As mentioned, audit firms can adopt various risk management strategies, which could act as substitutes. In order to reduce the likelihood that alternative risk management strategies could influence the results, I focus on a setting in which the use of other risk management strategies is minimized, and in which therefore the use of audit partner expertise as a risk management strategy is most likely to occur. I do this by focusing on a sample of client companies for which the audit partner changed, but the audit firm did not. While the reason for the change in partner could vary, this setting creates an opportunity to test whether a partner with more (less) expertise is allocated to a client with higher (lower) risk.

In total, 28,735 unique companies are available for these fiscal years, resulting in 167,379 company years. From this initial sample, observations are removed, for the following reasons (see also Table 1a):

- Due to their specific audit environment, utilities (four digit NACE industry codes between 4000 and 4,100) and financial institutions (four digit NACE-codes between 6500 and 6720) are excluded from the sample (n=11,675).
- Subsidiaries are removed from the sample, because audit partner allocation may be driven by decisions of the parent company, instead of being based on characteristics of the subsidiary.

- Observations with missing values were removed (n=56,490). Most of these are removed because of missing financial information for the current or prior fiscal year (n=53,602). The other 2,888 observations were removed because the audit partner was not identified in the Bel-First database.
- Observations with more than one audit partner are removed (n=6,480), because the assignment of multiple partners may already be considered to be a risk management strategy.[5]
- Observations for which the audit firm is a sole proprietorship (i.e. a firm with only one auditor partner) are removed (n=13,343), because these firms cannot allocate auditors to clients based on client risk.
- 15,845 Observations are removed because no auditor information is available for the prior fiscal year, either because the company was not included in the database before, or because of omission for one or more years. In these cases it is impossible to determine if or when a partner change occurred.
- Company observations that continued to be audited by the same partner were removed (n=40,036), because in these cases no allocation decision takes place. This has the additional advantage that it controls for client specific experience. Therefore it is possible to examine the extent to which general experience and industry expertise are used as risk management strategies, without client specific experience playing a role in the assignment process.
- Companies that switched to another audit firm were also removed (n=2,758), because it is likely that the partner who attracted the new client becomes the engagement partner, without a formal allocation decision taking place.
- Finally, 194 observations were removed from the sample because for these observations there was only one partner from the audit firm accepting new clients, making it impossible to measure relative partner expertise and relative client risk.

The final sample includes 2,554 observations. An overview the remaining observations, per fiscal year, is given in table 1b, which shows that the number of observations is quite evenly distributed across the sample years.

<Insert Tables 1a and 1b about here>

[5] This includes cases where two partners from the same audit firm are responsible for the audit engagement, as well as cases where auditors partners from different firms are conducting the audit.

Measurement

This section discusses the measurement of partner expertise, client risk factors, as well as a number of controls.

Dependent variables

Experience is commonly assumed to be a primary determinant of improved expertise (e.g. Hamilton and Wright 1982, Bonner and Lewis 1990, Marchant 1990). However, Bonner and Lewis (1990) argue that even though it is common to measure expertise based on experience, it is an incomplete measure of expertise.[6] Therefore I will use two measures of expertise. The first measure of expertise I use is general experience. The second measure of expertise, suggested by Bonner and Lewis (1990) and commonly used in auditing research, is industry expertise.

The first dependent variable, GENERAL_EXPERIENCE, is defined as the number of years since the auditor has obtained his title as certified public accountant.[7]

The second dependent variable is INDUSTRY_EXPERTISE$_i$. While prior studies commonly measure industry expertise at the level of the audit firm, Francis et al. (2005) argue that industry expertise partly resides in individuals. I measure partner industry expertise as the ratio of the sum of total assets from clients within industry (i), divided by to the sum of total assets from all clients which were audited by the partner in the last year.[8] An overview of the number of observations per industry is provided in Appendix C.

$$INDUSTRY\_EXPERTISE_{i,t} = \frac{TOTAL\_ASSETS\_OF\_CLIENTS\_WITHIN\_INDUSTRY\_i_{t-1}}{TOTAL\_ASSETS\_OF\_ALL\_CLIENTS_{t-1}}$$

Risk proxies

Prior research has indicated a number of variables that proxy for audit risk, client business risk and auditor business risk (e.g. Simunic and Stein 1996; Krishnan and Krishnan

[6] Bonner and Lewis (1990) identify four determinants of expertise, which are: general domain knowledge, subspeciality knowledge, general business knowledge, general problem-solving ability. General domain knowledge, general business knowledge and general problem-solving ability are acquired through training and general experience. Subspeciality knowledge relates to industry or client specific knowledge.

[7] In total there are 48 auditors which left the audit profession for a certain period of time. I have decided not to penalize them for the years not spent in the profession, since the experience they gained outside of the profession may have increased their expertise. Penalizing these auditors by subtracting the years spent outside the audit profession does not meaningfully change the results.

[8] Similar results are obtained when industry expertise is measured using the ratio of the number of audited clients within an industry to the total number of audited clients.

1997; Shu 2000; Francis and Reynolds 2001; Choi et al. 2004, Hay and Jeter 2008). In this section I describe variables that are relevant to the current setting.

A number of variables are used in prior literature to proxy for audit risk. Receivables and inventory are typically accounts that are difficult to audit, and where financial statement misstatements occur often (Feroz et al. 1991), hence requiring judgments by auditors (Simunic 1980). Therefore, a first risk measure that is used to proxy for inherent risk is the sum of inventory plus receivables, scaled by total assets (IRTA) (e.g. Simunic 1980, Krishnan and Krishnan 1997, Francis and Reynolds 2001, Gaeremynck and Willekens 2003).

Another, comparable measure that is commonly used in auditing research to proxy for audit risk is the ratio of current assets over total assets (CATA), where a higher ratio indicates a higher audit risk (Ferguson, Francis and Stokes 2003, Francis, Reichelt and Wang 2005, Ferguson et al. 2006, Hay and Jeter 2008).

Asset Turnover (TURN) is measured as the ratio of sales to total assets. A higher turnover indicates a lower client business risk (Francis and Reynolds 2001), but also a higher transaction complexity and is associated with more audit effort (Chaney et al. 2004).

There are also various measures of firm profitability, of which I use the Return on Assets (ROA), and the Net Profit Margin (NPM). ROA is calculated as net income divided by total assets. NPM is calculated as net income divided by sales. Companies with a higher value for either of these variables have a lower client business risk.

Client financial distress is a common reason for litigation against the auditor (Palmrose 1987; St. Pierre and Anderson 1984) Companies with a low liquidity faces a higher risk of short term insolvency (Francis and Reynolds 2001). The quick ratio (QUICK) is measured as the ratio of current assets (minus inventory) to current liabilities. A quick ratio lower than 1 is usually perceived as an indicator of client business risk.

Leverage (LEV) is an objective measure of capital structure and bankruptcy risk which has been used in previous auditing research (Simunic and Stein (1996). LEV is measured as the ratio of total debt to total assets. Companies that have a higher leverage pose higher client business risk.

A public listing is an important part of auditor business risk (Johnstone and Bedard 2003). Companies that are listed on a stock exchange receive more media attention, and therefore present a greater possible reputation loss in case of material misstatements that were not detected by the auditor. The risk of litigation and the damage awards are also greater for clients with a stock listing (St. Pierre and Anderson 1984; Lys and Watts 1994). The variable

LISTED is set to equal 1 if the company it listed on the Belgian stock exchange, 0 if it is a private company.

Control Variables

Belgian companies that have more than 100 employees are required to submit economic and financial information to a works council, and auditors are obliged to explain this information to the works council. The variable WORKS_COUNCIL indicates whether a company is required to have a works council. According to Lefevbre et al. (1995), employees are important users of the financial statements in companies with a work council. The effect of relations with banks, trade creditors and employees on earnings management is however unclear (Sercu et al 2002). Hence, the effect of having a works council on audit partner allocation is also not directly obvious.

The quality of the internal control system may play a role in the partner allocation process. In Belgium, for companies with more than 100 employees, the auditor is also required to report on the quality of the internal control system. CONTROL_PROBLEM indicates whether the auditor reported an internal control weakness in the auditor's report.

Next, a number of measures of complexity are included. More complex clients are likely to benefit more from a partner with a higher level expertise. Two common measures used to proxy for complexity are the number of subsidiaries, and the number of industries in which the client operates (Simunic 1984). NUM_SUBS is the number of subsidiaries in which the company has a more than 50 percent interest. NUM_INDS is measured as the number of two digit NACE industry codes which are stated for the company.

Finally, I use two measures of client size, the natural log of total assets (TOTAL_ASSETS) and the natural log of revenues (REVENUES). Reynolds and Francis (2001) state that larger companies pose greater litigation risk. However, client size is positively related to the amount of audit fees, making larger clients potentially more interesting for audit partners.

4. Results

In this section I will present some descriptive statistics, followed by a factor analysis aimed at reducing the large number of variables that are used as proxies for risk. Subsequently, the regression models are presented, and finally the results of the regressions.

Descriptive statistics

For the reasons explained in section 3, I use the sample of 2,554 observations for the analyses. However, I will first provide some general descriptive statistics for the Belgian market for audit services. For these first descriptive statistics I use a more complete sample of 74,730 observations for which auditor and financial information are available.

<Insert Tables 2a and 2b about here>

The 74,730 observations are audited by 483 different audit firms and 900 different partners. Tables 2a and 2b provide some insight into the market shares of the Belgian audit firms for the sample examined in the current study. The tables show that the Big N audit firms had a market share of 48 percent when measured as the number of conducted audits.[9] The percentage of audited assets by the Big N audit firms is 79 percent. This shows that the relatively largest companies are audited by Big N audit firms. The percentage of clients audited by Big N audit firms is lower than what is usually reported in studies that examine only listed companies, where the Big N audit firms have a more dominant market share.

<Insert Table 3 about here>

Table 3 provides both the number of clients per audit firm, as well as the number of clients per audit partner differ between small firms and the Big N audit firms. The average number of clients per audit partner for the Big N firms ranges from 17.28 to 19.06, while it ranges from 10.22 to 12.27 clients per partner per year for the non-Big N firms. The average number of clients for sole proprietorships is even smaller, ranging from 6.69 to 7.49. The average number of clients per audit firm also differs between Big N audit firms and the non-Bign N audit firms.

Table 4 displays the general experience for all of the partners included in the sample of 74,730 observations. The general experience per partner is on average lower than for sole proprietorships and other non-Big N audit firms.

<Insert Table 4 about here>

[9] The BIG N are defined as Arthur Andersen. Deloitte, Ernst & Young, KPMG and PwC. Even though Arthur Andersen ceased to exist after the Enron scandal, it is still included in the first four years of the sample.

For the remaining analyses I focus on the sample of 2,554 observations for which the audit partner changed. Table 5 provides the descriptive statistics for the variables that were discussed in the previous section, as well as a definition of each of the variables.[10] As the auditor allocation takes place at the beginning of the fiscal year, it can be expected to be based on the audited financial statements of the previous year.[11] For this reason, I have decided to use financial information from the previous year to explain partner allocation in the year under examination.

Less than 1 percent of the companies included in the sample have a stock exchange listing and only observations for the non-Big N sample refers to a listed company. Internal control problems are reported for only 0.2 percent of the observations included in the sample.

The general partner experience for the Big N sample is higher than for the non-Big N sample (difference significant at the 5 percent level). Together with the results of Table 4 this suggests that partners of Big N firms with more years of experience audit more clients than the partners with less experience, suggesting that partners start with a small portfolio of clients, which increases as they get more years of experience. Partners of the Big N audit firms also have a higher industry expertise than partners of Big N audit firms (difference significant at the 1 percent level).

<Insert Table 5 about here>

Factor Analysis

The aforementioned risk variables are correlated (see table 6), and are used as proxies for similar risk factors. Factor analysis is used reduce the number of variables by summarizing them into a smaller set of factors. Factor analysis is applied to the 11 continuous risk variables, also shown in table 7.[12] The selected variables are similar to those described in table 5, with the exception that I use the natural logs of the following variables to control for heteroscedasticity: $TOTAL\_ASSETS_{t-1}$, $REVENUES_{t-1}$, NUM_SUBS_{t-1}, andNUM_INDS_{t-1}. Furthermore, $TOTAL\_ASSETS_{t-1}$ and $REVENUES_{t-1}$ are corrected for inflation using the GDP price deflator.

[10] All variables have been winsorized at the top and bottom 1 percent to reduce the impact of outliers in the further analyses.

[11] The audit partner assignment takes place during the annual general meeting of shareholders.

[12] Shapiro et al. (2002) warn that the usage of dichotomous variables in factor analyses may result in unexpected findings. They report that 19 randomly and independently generated dummy variables can result in 5 factor solutions explaining 30 percent of the total variance and rotated loadings exceeding the traditional .40 cutoff. Therefore, dichotomous variables are not included in the factor analysis.

<Insert Table 6 about here>

Because my goal is to identify the latent constructs by creating a small number of factors to account for the intercorrelations among the observed variables, I use common factor analysis instead of component factor analysis. [13] In addition, common factor analysis is more appropriate as it does not require the assumption that the error and specific variance represent a small portion of the total variance (Hair et al. 2006).

I use a three factor solution, which is suggested by the root criterion, the proportion criterion, and the scree plot all suggest a three factor solution.[14] After applying an oblique factor rotation on the standardized variables, the following factor loadings are obtained: [15] [16]

<Insert Table 7 about here>

The first factor loads on two audit risk related factors $IRTA_{t-1}$ and $CATA_{t-1}$, and on $TURN_{t-1}$ and will therefore be labeled $AUDIT\_RISK_{t-1}$. Factor 2 loads on two size variables (the natural log of $TOTAL\_ASSETS_{t-1}$, and the natural log of $REVENUES_{t-1}$), and will therefore be labeled $SIZE_{t-1}$. The third factor loads on two profitability measures (ROA_{t-1} and NPM_{t-1}), and two debt variables ($QUICK_{t-1}$ and LEV_{t-1}). These variables are all measures of client financial health, and therefore this variable will be labeled $CLIENT\_BUSINESS\_RISK_{t-1}$. The variables that have a loading below .40 are not included in the further analyses.

Regressions

Ordinary least squares regressions are used to test the hypotheses, whether the allocation of partners depends on the three types of risk: audit risk, client business risk, and auditor business risk).

The measures $AUDIT\_RISK_{t-1}$ and $CLIENT\_BUSINESS\_RISK_{t-1}$ follow from the factor analysis discussed in the previous paragraph. Both these variables are measured in such a way that a higher value indicates a higher risk. Therefore, in line with my hypotheses, I expect a negative correlation between $AUDIT\_RISK_{t-1}$ and $CLIENT\_BUSINESS\_RISK_{t-1}$ and the

[13] Common factor analysis is also referred to as principal axis factoring.

[14] The latent root criterion suggests retaining only factors which have an eigenvalue exceeding one.

[15] Compared to an orthogonal rotation, an oblique rotation method is more realistic since it does not require the assumption that the underlying dimensions are uncorrelated with each other.

[16] When using the orthogonal VARIMAX rotation method the factor loadings are similar to the ones obtained with the oblique PROMAX rotation method.

expertise measures. A stock exchange listing is used to proxy for auditor business risk, $AUDITOR\_BUSINESS\_RISK_{t-1,}$ for which I also expect a positive relationship with the expertise measures.

In addition, a number of control variables will be used. Based on the earlier discussion I expect a positive relationship between the variable $CONTROL\_PROBLEM_{t-1}$ and the dependent variables $GENERAL\_EXPERIENCE_t$ and $INDUSTRY\_EXPERTISE_t$. The directional effects of $WORKS\_COUNCIL_{t-1}$ and $SIZE_{t-1}$ are less straight forward. Furthermore, I include dummy variables to control for fiscal year. I also include interaction effects with BIGN, which measures whether a company is audited by a Big N audit firm (1) or a non-Big N audit firm (0), to allow for different coefficients for Big N audit firms, and smaller non-Big N audit firms. I also include the variable BIGN to make sure that the main effect is incorporated.

For each fiscal year, the dependent variable and the continuous independent variables are group mean centered. This way it is possible to examine whether an audit firm allocates a partner with relatively higher (lower) expertise to a client that poses relatively higher (lower) risk. The definitions for the restated variables are provided in table 8.

To test whether more experienced auditors are allocated to clients with respectively a higher audit risk, a higher client business risk and a higher audit business risk, a regression is estimated in which the relative general experience of the audit partner is tested as a function of the aforementioned risk and control variables, as described in the following model:

$$
\begin{aligned}
REL\_GENERAL\_EXPERIENCE_t = {} & \beta_0 + \beta_1\, REL\_AUDIT\_RISK_{t-1} + \beta_2\, REL\_CLIENT\_BUSINESS\_RISK_{t-1} \\
& + \beta_3\, AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\, REL\_SIZE_{t-1} + \beta_5\, WORKS\_COUNCIL_{t-1} + \beta_6\, CONTROL\_PROBLEM_{t-1} \\
& + \beta_7\, BIGN + \beta_8\, (REL\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\, (REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) \\
& + \beta_{10}\, (REL\_AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\, (SIZE_{t-1} * BIGN) \\
& + \beta_{12}\, (WORKS\_COUNCIL_{t-1} * BIGN) + \beta_{13}\, (CONTROL\_PROBLEM_{t-1} * BIGN) \\
& + \beta_{14\text{-}20}\, YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.
\end{aligned}
\tag{1}
$$

Similarly, to examine whether audit partners with greater industry expertise are allocated to clients with respectively a higher audit risk, a higher client business risk and a higher audit business risk, a regression is estimated in which the relative industry expertise of the audit partner is regressed on the risk variables and control variables, as reflected in the following model:

$$\begin{aligned}REL\_INDUSTRY\_EXPERTISE_t = {} & \beta_0 + \beta_1\, REL\_AUDIT\_RISK_{t-1} + \beta_2\, REL\_CLIENT\_BUSINESS\_RISK_{t-1} \\ & + \beta_3\, AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\, REL\_SIZE_{t-1} + \beta_5\, WORKS\_COUNCIL_{t-1} + \beta_6\, CONTROL\_PROBLEM_{t-1} \\ & + \beta_7\, BIGN + \beta_8\, (REL\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\, (REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) \\ & + \beta_{10}\, (REL\_AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\, (SIZE_{t-1} * BIGN) \\ & + \beta_{12}\, (WORKS\_COUNCIL_{t-1} * BIGN) + \beta_{13}\, (CONTROL\_PROBLEM_{t-1} * BIGN) \\ & + \beta_{14\text{-}20}\, YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon. \end{aligned} \quad (2)$$

Test of hypotheses

Ordinary least squares regressions with robust standard errors are estimated to test the previously stated hypotheses. The sample includes multiple observations per partner per year, and therefore the assumption that observations are independent is violated. Therefore, I use robust standard errors to allow observations to be correlated within clusters of the same partner. To estimate whether audit firms allocate partners with greater expertise to relatively more risky clients that, all the explanatory variables have been group mean centered, for each audit firm, per fiscal year.

Panel A of table 8 shows the results for hypotheses 1, 2 and 3. Results are reported for 3 different samples: (1) a sample which includes Big N clients only, (2) a sample that includes non-Big N clients only, and (3) the full sample, which includes clients from both Big N firms and non-Big N firms.[17] The model is significant for each of the three samples, and the R-Square ranges from 1.78 percent for the full sample, to 3.35 percent for the sample with only non-Big N clients.

The full sample shows that the coefficient for the $REL\_AUDIT\_RISK_{t-1}$ is in the expected direction and significant at the 1 percent level (β=.847, $p<0.01$). The interaction term between $REL\_AUDIT\_RISK_{t-1}$ and BIGN is negative and significant (β=-.863, $p<0.05$). This indicates that there is support for hypothesis 1, which states that audit firms allocate partners with more expertise to clients that pose higher audit risk, but only for clients from non-big N audit firms. This is confirmed by the results for $REL\_AUDIT\_RISK_{t-1}$ in the subsamples, which is positive and significant for the sample of Non-Big N clients (β=.829, $p<0.05$), but insignificant for the sample of Big N clients (β=-.015, $p>0.10$).

The coefficient for the variable $REL\_CLIENT\_BUSINESS\_RISK_{t-1}$ is insignificant for each of the three samples, and thus provides insufficient evidence to accept hypothesis 2, which states that audit firms allocate partners with greater expertise to clients that pose higher client business risk.

[17] This group of non-Big N audit firms only includes audit firms with more than 2 partners, because there is no partner allocation decision for sole proprietorships.

Hypothesis 3 is tested using the variable AUDITOR_BUSINESS_RISK$_{t-1}$. The coefficient of this variable is positive and significant in both the Big N sample (β=4.779, p<0.01) and in the full sample (β=3.502, p<0.01). The coefficient however is insignificant in the Non-Big N sample, possibly because the number of listed companies audited by non-Big N audit firms is low. The results support the hypothesis that Big N audit firms allocate partners with greater general experience to clients which pose a higher auditor business risk. No support is found for non-Big N audit firms.

None of the control variables has a significant effect on the general experience of the allocated partner, suggesting partner allocation is not affected by these factors.

<Insert Tables 8a and 8b about here>

Panel B of Table 8 shows the results for the regressions in which industry expertise is regressed on the risk and control variables. The model is significant for all three samples, and the R-Square ranges from 2.23 percent for the Big N sample, to 3.71 percent for the non-Big N sample.

The coefficient for REL_AUDIT_RISK$_{t-1}$ for the full sample is positive and significant at the 10 percent level (β=.036, p<0.10), providing support for hypothesis 1. The significant negative coefficient for the interaction term of REL_AUDIT_RISK$_{t-1}$ and BIGN (β=-.042, p<0.10) shows that the coefficient for the BIGN sample is lower than for the non-Big N sample. The coefficient for REL_AUDIT_RISKt-1 is only significant for the sample of clients of non-Big N audit firms (β=.036, p<0.10). This suggests that only non-Big N audit firms allocate partners with greater industry expertise to clients with a higher audit risk.

For all three samples are the coefficients of REL_CLIENT_BUSINESS_RISK$_{t-1}$ and AUDITOR_BUSINESS_RISK$_{t-1}$ insignificant, hypotheses 2 and 3 are therefore rejected.

The control variable WORKS_COUNCIL$_{t-1}$ has a negative and significant coefficient for the sample of clients from Big N audit firms, which suggests that Big N audit firms allocate a partner with lower industry expertise to clients with a works council.

The coefficient for the control variable CONTROL_PROBLEM$_{t-1}$ is negative and significant for the Big N sample (β=-.082, p<0.01). This suggests that Big N audit firms allocate partners with lower industry expertise to clients for which a control problem was reported in the prior fiscal year.

The control variable SIZE$_{t-1}$ is insignificant across all three samples, suggesting that size does not play a role in the partner allocation process.

Robustness Check

To verify the robustness of the results reported in the previous section, I also use recode the dependent variable and the continuous independent variables into dichotomous variables. For each fiscal year, the values above the median for an audit firm are set to equal 1. Values below the median are set to equal 0. Logistic regressions are used to test whether audit firms allocate partners with greater expertise to clients with higher risk. The equations used for estimating a logistic regression are similar to those used for the OLS regression. The equations to examine the use of general experience and industry expertise are shown in equations 3 and 4.

$$\begin{aligned}AM\_GENERAL\_EXPERIENCE_t = {} & \beta_0 + \beta_1\, AM\_AUDIT\_RISK_{t-1} + \beta_2\, AM\_CLIENT\_BUSINESS\_RISK_{t-1} \\ & + \beta_3\, AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\, AM\_SIZE_{t-1} + \beta_5\, WORKS\_COUNCIL_{t-1} \\ & + \beta_6\, CONTROL\_PROBLEM_{t-1} + \beta_7\, BIGN + \beta_8\, (AM\_AUDIT\_RISK_{t-1} * BIGN) \\ & + \beta_9\, (AM\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{10}\, (AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) \\ & + \beta_{11}\, (AM\_SIZE_{t-1} * BIGN) + \beta_{12}\, (WORKS\_COUNCIL_{t-1} * BIGN) \\ & + \beta_{13}\, (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\, YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.\end{aligned} \tag{3}$$

$$\begin{aligned}AM\_INDUSTRY\_EXPERTISE_t = {} & \beta_0 + \beta_1\, AM\_AUDIT\_RISK_{t-1} + \beta_2\, AM\_CLIENT\_BUSINESS\_RISK_{t-1} \\ & + \beta_3\, AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\, AM\_SIZE_{t-1} + \beta_5\, WORKS\_COUNCIL_{t-1} \\ & + \beta_6\, CONTROL\_PROBLEM_{t-1} + \beta_7\, BIGN + \beta_8\, (AM\_AUDIT\_RISK_{t-1} * BIGN) \\ & + \beta_9\, (AM\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{10}\, (AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) \\ & + \beta_{11}\, (AM\_SIZE_{t-1} * BIGN) + \beta_{12}\, (WORKS\_COUNCIL_{t-1} * BIGN) \\ & + \beta_{13}\, (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\, YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.\end{aligned} \tag{4}$$

Panel A of table 9 provides the results of the logistic regressions with general experience as the dependent variable; table 9 panel B provides the results for the logistic regressions with industry experience as the dependent variable.

The results from the logistic regressions using general experience as the dependent variable are consistent with the results shown in table 8 panel A. The model has a sufficient fit across all 3 samples, as indicated by the Hosmer and Lemeshow statistic which estimates the lack of fit. The statistic is insignificant for the three samples, therefore indicating no lack of fit. The maximum rescaled R-square ranges from 2.97 percent for the Big N sample to 7.79 percent for the non-Big N sample.

The coefficient for $AM\_AUDIT\_RISK_{t-1}$ in the full sample is positive and significant (β=.469, $p<0.10$). This effect is only evident for non-Big N audit firms, as shown by the

significant negative coefficient for the interaction effect of $AM\_AUDIT\_RISK_{t-1}$ and BIGN (β=-.482, $p<0.10$). The same applies when looking at the subsamples. The subsample with only Big N clients shows a negative and insignificant effect for $AM\_AUDIT\_RISK_{t-1}$, while the coefficient is positive and significant for the sample of non-Big N clients (β=.485, $p<0.10$). This provides further support for hypothesis 1.

The effect of $AM\_CLIENT\_BUSINESS\_RISK_{t-1}$ is insignificant for the full sample, as well as the two subsamples. This confirms the conclusion that there is no support for hypothesis 2.

The coefficient for $AUDITOR\_BUSINESS\_RISK_{t-1}$ is insignificant for the full sample and for the sample with non-Big N clients only. The interaction effect of $AUDITOR\_BUSINESS\_RISK_{t-1}$ and BIGN is insignificant in the full sample, suggesting that the coefficient of $AUDITOR\_BUSINESS\_RISK_{t-1}$ for Big N audit firms does not significantly differ from that for non Big N audit firms. However, the coefficient for $AUDITOR\_BUSINESS\_RISK_{t-1}$ in the Big N sample is positive and significant (β=2.208, $p<0.01$). This provides support for hypothesis 3 for Big N audit firms.

<Insert Tables 9a and 9b about here>

The logistic regression for industry expertise provides results which are generally consistent with those for the robust regression for industry expertise. The model is significant for all three samples. The maximum rescaled R-square ranges from 2.95 percent for the Big N sample, to 4.81 percent for the full sample.

The results for $AM\_AUDIT\_RISK_{t-1}$ estimated using the logistic regression are stronger than those obtained using the robust regression. In addition to the full sample (β=.433, $p<0.10$), and the non-Big N sample β=.433, $p<0.10$), the coefficient for $AM\_AUDIT\_RISK_{t-1}$ is positive and significant for the Big N sample as well (β=.154, $p<0.10$). This indicates that both Big N and non-Big N audit firms assign partners with a greater industry expertise to clients with a higher audit risk, providing support for hypothesis 1.

The coefficients for $AM\_CLIENT\_BUSINESS\_RISK_{t-1}$ and $AUDITOR\_BUSINESS\_RISK_{t-1}$ are insignificant; therefore hypotheses 2 and 3 are rejected. Thus, audit firms do not seem to use partner industry expertise as a risk management strategy for clients who pose either a higher client business risk or a higher auditor business risk. The coefficient for $AUDITOR\_BUSINESS\_RISK_{t-1}$ is significantly negative for the sample with clients of Big N audit firms (β=-1.361, $p<0.10$). This effect is opposite to the expected

direction. A possible explanation could be that the allocation of a partner with a greater general experience is considered to be a sufficient risk management strategy, due to which industry expertise is considered to be a less relevant component of expertise.

$WORKS\_COUNCIL_{t-1}$ has a negative and significant coefficient for the sample with Big N clients (β=-.578, $p<0.05$), suggesting that audit firms allocate partners with less industry expertise to clients who have a works council. The effects of the other control variables are insignificant.

5. Conclusion

The use of risk management strategies is important for an audit firm to reduce the impact of client risks (i.e. audit risk, client business risk and auditor business risk). Prior studies have examined the use of experience as a risk management strategy by looking at the (planned) allocation of partner or manager hours, but the use of engagement partner expertise has not yet been examined. This study contributes to the literature by testing the actual use of partner expertise as a risk management strategy using data from a complete audit market.

From a risk management perspective as well as from a cost minimization perspective it can be argued that audit firms benefit mostly from allocating partners with the most expertise to audit clients with the greatest risk. However, due to personal liability issues of the engagement partner, audit partners might be reluctant to audit clients who pose a high risk, which could result in a less than optimal allocation of partners across clients. It is therefore important to examine whether audit firms conform to audit standards by allocating partners with more expertise to clients which pose greater risks, or whether personal interests dominate resulting in less than optimal partner allocation, posing possibly high risks to the audit firms.

This study uses Belgian data on audits conducted between 1998 and 2006. The main advantage of the chosen setting is that because of the availability of data on all conducted audits (including information about the audit firm and the audit partner), as well as the possibility to construct a measure of experience for every auditor operating in this market, it is possible to provide evidence on the actual use of audit partner experience as a risk management strategy, as opposed to the planned allocation used in prior studies.

Evidence is found in support of the hypothesis that the audit firms assign partners with more general experience to clients with higher audit risk. Big N audit firms also assign partners with more general experience to clients that pose a high auditor business risk. The

use of expertise as a risk management is further supported by the allocation of partners with more industry expertise to clients which pose a higher audit risk. No evidence is found that supports the use of partner expertise a risk management strategy for clients with a high client business risk. These results are consistent with Johnstone and Bedard (2003) who examined the planned use of experts as a risk management strategy for the same risk categories.

Overall results support the main research question that audit partner expertise is used a risk management strategy. This finding is consistent with the requirements posed by auditing standards to adjust audit team composition based on client risk characteristics.

Limitations

There are some limitations to this study. First of all, given that the research is conducted using public data, it is not possible to control for all other risk management strategies which an audit firm could use. This issue has been partly resolved by using a sample in which many of the other risk management strategies are unlikely to be used, and in which the use of partner expertise as a risk management strategy is most likely to occur.

Related to this is the issue that this study relies on public proxies of risk. Private measures of risk might be able to more accurately represent client risk, but are however subject to a possible bias by the audit partner.

Finally, the use of Belgian data might be considered an issue because this setting is in many ways different from the US setting, which is commonly researched. The most prominent difference is that Belgium has a low litigious environment. However, prior research has shown that there are other mechanisms in place which make sure that audit quality is maintained at a sufficiently high level (Gaeremynck and Willekens 2003).

Future research

Future research would be helpful in investigating how firms make trade-offs between the use of different risk management strategies, and whether these risk management strategies operate as complements or substitutes. In addition, future research could attempt to incorporate audit fee data to measure market share and industry expertise more accurately.

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Tables

Table 1a
Sample selection

A) Initial Sample		167,379
Utilities and Financial Institutions	-11,675	
Subsidiaries	-18,004	
Missing values	-56,490	
More than 1 audit partner	-6,480	
B) Full Sample		74,730
Sole Proprietorships	-13,343	
Lack of prior year auditor information	-15,845	
No change in audit partner change	-40,036	
Switch to another audit firm	-2,758	
Audit firms with only one partner accepting new clients	-194	
C) Sample for analyses		2,554

Table 1b
Observations per year

Year	Full Sample	Change Sample
1998	7,862	--
1999	8,014	311
2000	8,171	290
2001	8,358	281
2002	8,298	227
2003	8,348	417
2004	8,498	359
2005	8,643	366
2006	8,538	303
Total	74,730	2,554

Table 2a
Market Shares – Number of Clients
n=74,730

Audit firm name	Number of clients	Percentage Market Share
Ernst & Young	10,226	13.68%
PricewaterhouseCoopers	8,858	11.85%
Deloitte & Touche	7,865	10.52%
Klynveld Peat Marwick Goerdeler	7,073	9.46%
BDO Atrio	2,128	2.85%
Arthur Andersen	1,619	2.17%
Grant Thorton, Lippens, Rabaey & Co	1,292	1.73%
TCLM – Toelen, Cats	1,051	1.41%
Van Passel, Mazars & Guerard	1,014	1.36%
Hermant, Dodemont & Co	957	1.28%
Full Sample	74,730	100.00%

Table 2b
Market Shares – Audited Assets
(in billions of euro's)
n=74,730

Audit Firm Name	Audited Assets	Percentage Market Share
PricewaterhouseCoopers	667.24	22.88%
Ernst & Young	542.02	18.58%
Klynveld Peat Marwick Goerdeler	531.86	18.24%
Deloitte & Touche	486.25	16.67%
Arthur Andersen	88.65	3.04%
Van Passel, Mazars & Guerard	33.47	1.15%
BDO Atrio	33.09	1.13%
Grant Thorton, Lippens, Rabaey & Co	26.22	0.90%
TCLM – Toelen, Cats	24.45	0.84%
Callens, Guevar, Van Impe & Co	22.26	0.76%
Full Sample	2,916.69	100.00%

Table 3

Average number of clients per firm and per partner

n=74,730

	BIG N		*Non-BIG N*		*Sole proprietorships*
Year	Avg. number of clients per partner	Avg. number of clients per firm	Avg. number of clients per partner	Avg. number of clients per firm	Avg. number of clients per firm
1998	17.53	694.40	11.91	37.36	7.18
1999	18.24	744.20	12.27	40.50	6.98
2000	18.52	785.40	10.85	36.93	7.44
2001	17.95	836.60	10.91	36.68	7.10
2002	17.28	1,045.25	10.22	34.16	7.49
2003	17.71	1,027.25	10.24	34.59	7.24
2004	19.06	1,019.50	10.62	36.33	6.69
2005	18.51	1,013.50	10.92	37.12	6.96
2006	18.21	979.00	10.87	38.58	7.42

Table 4

Number of partners and their average experience

n=74,730

	BIG N		*Non-BIG N*		*Sole proprietorships*	
Year	Number	Avg. Exp.	Number	Avg. Exp.	Number	Avg. Exp.
1998	198	13.22	254	13.49	190	13.67
1999	204	13.65	231	13.65	209	14.06
2000	212	13.65	245	14.36	213	14.74
2001	233	13.87	242	15.10	216	14.93
2002	242	14.78	254	15.85	203	15.70
2003	232	14.96	267	16.47	208	16.46
2004	214	15.57	284	16.92	210	16.90
2005	219	15.52	289	17.46	206	17.31
2006	215	15.87	284	17.94	207	17.88

Table 5

Descriptive Statistics

Variables	Big N clients	Non-Big N clients	All companies
	n=2,442	n=312	n=2,554
$IRTA_{t-1}$	.542(0.287)	.516(0.267)	.539(0.285)
$CATA_{t-1}$	.698(0.291)	.672(0.277)	.695(0.290)
$TURN_{t-1}$	1.735(1.456)	1.821(1.544)	1.745(1.467)
$QUICK_{t-1}$	2.028(3.719)	1.785(3.301)	1.998(3.670)
LEV_{t-1}	.655(0.260)	.644(0.247)	.654(0.259)
NPM_{t-1}	.060(0.462)	.048(0.379)	.059(0.452)
ROA_{t-1}	.024(0.124)	.027(0.095)	.024(0.121)
TA_{t-1}	39.209(100.642)	14.932(48.326)	36.244(96.118)
REV_{t-1}	36.052(79.242)	17.074(37.950)	33.733(75.671)
$WORKS\_COUNCIL_{t-1}$	.216	.119	.204
$CONTROL\_PROBLEM_{t-1}$	.001	.006	.002
$LISTED_{t-1}$	.007	.003	.006
NUM_INDS_{t-1}	1.707(0.929)	1.625(0.902)	1.697(0.926)
NUM_SUBS_{t-1}	.750(1.818)	.728(1.612)	.747(1.794)
$GENERAL\_EXPERIENCE_t$	11.444(6.065)	10.715(6.560)	11.355(6.131)
$INDUSTRY\_EXPERTISE_t$	.138(0.190)	.103(0.177)	.134(0.188)

Variable definitions

$IRTA_{t-1}$	Receivables in year t-1 plus inventory in year t-1 scaled by total assets in year t-1.
$CATA_{t-1}$	Current assets in year t-1 scaled by total assets in year t-1.
$TURN_{t-1}$	Asset turnover in year t-1, defined as the ratio of sales to total assets.
$QUICK_{t-1}$	Quick ratio in year t-1, defined as the ratio of current assets minus inventory to current liabilities.
LEV_{t-1}	Leverage in year t-1, defined as the ratio total debt to total assets.
NPM_{t-1}	Net profit margin for year t-1, calculated as net income divided by sales.
ROA_{t-1}	Return on assets for year t-1, calculated profit divided by total assets.
$TOTAL\_ASSETS_{t-1}$	Total assets in year t-1 stated in thousands of Euro's.
$REVENUES_{t-1}$	Revenues in year t-1 stated in thousands of Euro's
$WORKS\_COUNCIL_{t-1}$	Dummy variable indicating 1 if the company had more than 100 employees in the previous year, 0 otherwise.
$CONTROL\_PROBLEM_{t-1}$	Dummy variable indicating 1 if an internal control weakness was reported in the auditor's report of the previous fiscal year, 0 if no control problem was reported.
$LISTED_{t-1}$	Dummy variable, indicating 1 if the company is listed on the Belgian stock exchange, 0 otherwise.
NUM_INDS_{t-1}	Number industries in which the company operates, measured as the number of 2-digit NACE industry codes.
NUM_SUBS_{t-1}	Number of subsidiaries in which the company holds a more than 50 percent interest.
$GENERAL\_EXPERIENCE_t$	Number of years since the auditor obtained his CPA title.
$INDUSTRY\_EXPERTISE_{i,t}$	Measure of partner industry expertise, computed as the number of clients audited by the partner within the industry during the previous year, divided by the total number of clients audited by this partner in the previous year.

The number between brackets denotes the standard deviation.

Table 6 Correlation Matrix

n=2,554

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) $IRTA_{t-1}$	1	**.730**	**.525**	**.094**	**.128**	**-.126**	**.047**	**-.222**	**.146**	**-.086**	-.011	-.029	-.024	**-.170**	.019	**.080**
(2) $CATA_{t-1}$	**.788**	1	**.431**	**.320**	**.071**	-.004	**.137**	**-.287**	.021	**-.167**	-.013	-.038	.014	**-.244**	.017	**.137**
(3) $TURN_{t-1}$	**.463**	**.437**	1	**-.074**	**.174**	**-.219**	**.135**	**-.281**	**.397**	.034	.014	-.017	-.024	**-.135**	**.056**	.034
(4) $QUICK_{t-1}$	**-.074**	**.056**	**-.213**	1	**-.540**	**.315**	**.282**	**-.115**	**-.178**	**-.095**	.004	-.007	**.060**	**-.117**	-.037	.030
(5) LEV_{t-1}	**.147**	**.056**	**.216**	**-.484**	1	**-.412**	**-.358**	-.003	**.109**	-.014	-.018	-.021	**-.054**	**-.043**	.018	**.069**
(6) NPM_{t-1}	**-.058**	-.003	**-.122**	**.284**	**-.270**	1	**.843**	**.092**	**-.082**	-.028	.004	.017	**.070**	.006	**-.040**	.002
(7) ROA_{t-1}	.016	**.082**	.034	**.080**	**-.255**	**.379**	1	-.024	**.078**	.001	-.003	.014	**.088**	-.022	-.015	-.001
(8) $TOTAL\_ASSETS_{t-1}$	**-.226**	**-.275**	**-.268**	.009	-.004	**.184**	**.061**	1	**.686**	**.516**	-.018	**.107**	**.041**	**.377**	-.037	**-.080**
(9) $REVENUES_{t-1}$	**.195**	**.128**	**.349**	**-.288**	**.183**	**-.056**	**.108**	**.666**	1	**.579**	-.007	**.104**	.021	**.296**	.024	**-.081**
(10) $WORKS\_COUNCIL_{t-1}$	**-.064**	**-.100**	-.003	**-.117**	.014	**-.042**	.000	**.509**	**.556**	1	.000	**.134**	.012	**.338**	.025	**-.152**
(11) $CONTROL\_PROBLEM_{t-1}$	-.007	-.012	.016	.014	-.018	.001	.021	-.015	-.008	.000	1	**-.003**	-.037	.007	.008	-.029
(12) $LISTED_{t-1}$	-.025	-.025	-.015	-.016	-.016	-.002	.022	**.122**	**.115**	**.134**	-.003	1	-.015	**.119**	**.069**	**-.042**
(13) NUM_INDS_{t-1}	-.017	.024	-.043	.019	**-.048**	-.034	**.053**	**.039**	.024	.009	-.036	-.016	1	-.004	**-.057**	-.008
(14) NUM_SUBS_{t-1}	**-.151**	**-.197**	**-.117**	**-.051**	-.023	.003	.007	**.367**	**.271**	**.321**	.010	**.108**	-.003	1	**.051**	**-.072**
(15) $GENERAL\_EXPERIENCE_t$	.019	.028	**.046**	-.031	.015	**-.040**	-.002	-.036	.009	.023	.006	**.071**	**-.054**	**.048**	1	**.162**
(16) $INDUSTRY\_EXPERTISEi_{,t}$	**.039**	**.082**	.030	.003	**.062**	-.014	.014	**-.074**	**-.086**	**-.157**	-.020	-.035	.008	**-.080**	-.007	1

Pearson correlations are displayed below the diagonal, Spearman correlations are displayed above the diagonal.
Correlations significant at the 5 percent level are displayed in bold.

Table 7
Factor Analysis
n=2,554

	Factor 1	Factor 2	Factor 3
Cronbach's Alpha	*.794*	*.799*	*.622*
$IRTA_{t-1}$	**.828**	-.056	.046
$CATA_{t-1}$	**.849**	-.116	.184
$TURN_{t-1}$	**.635**	.026	-.191
$QUICK_{t-1}$	-.022	-.147	**.587**
LEV_{t-1}	.069	.061	**-.581**
NPM_{t-1}	.037	.124	**.570**
ROA_{t-1}	.162	.150	**.443**
$LN(TOTAL\_ASSETS_{t-1})$	-.252	**.867**	.175
$LN(REVENUES_{t-1})$	.295	**.856**	-.084
$LN(NUM\_SUBS_{t-1})$	-.186	.369	-.004
$LN(NUM\_INDS_{t-1})$	.000	.032	.049

Variable definitions

$IRTA_{t-1}$	Receivables in year t-1 plus inventory in year t-1 scaled by total assets in year t-1.
$CATA_{t-1}$	Current assets in year t-1 scaled by total assets in year t-1.
$TURN_{t-1}$	Asset turnover in year t-1, defined as the ratio of sales to total assets.
$QUICK_{t-1}$	Quick ratio in year t-1, defined as the ratio of current assets minus inventory to current liabilities.
LEV_{t-1}	Leverage in year t-1, defined as the ratio total debt to total assets.
NPM_{t-1}	Net profit margin for year t-1, calculated as net income divided by sales.
ROA_{t-1}	Return on assets for year t-1, calculated profit divided by total assets.
$LN(TOTAL\_ASSETS_{t-1})$	Natural log of total assets in year t-1 stated in thousands of Euro's, corrected for inflation using the GDP price deflator.
$LN(REVENUES_{t-1})$	Natural log of revenues in year t-1 stated in thousands of Euro's, corrected for inflation using the GDP price deflator.
$WORKS\_COUNCIL_{t-1}$	Dummy variable indicating 1 if the company had more than 100 employees in the previous year, 0 otherwise.
$CONTROL\_PROBLEM_{t-1}$	Dummy variable indicating 1 if an internal control weakness was reported in the auditor's report of the previous fiscal year, 0 if no control problem was reported.
$LISTED_{t-1}$	Dummy variable, indicating 1 if the company is listed on the Belgian stock exchange, 0 otherwise.
$LN(NUM\_INDS_{t-1})$	Natural log of the number industries in which the company operates, measured as the number of 2-digit NACE industry codes.
$LN(NUM\_SUBS_{t-1})$	Natural log of the number of subsidiaries in which the company holds a more than 50 percent interest.
$GENERAL\_EXPERIENCE_t$	Number of years since the auditor obtained his CPA title.
$INDUSTRY\_EXPERTISE_{i,t}$	Measure of partner industry expertise, computed as the number of clients audited by the partner within the industry during the previous year, divided by the total number of clients audited by this partner in the previous year.

Factors loadings above .400 are displayed in bold.
FACTOR 1 is labeled $AUDIT\_RISK_{t-1}$
FACTOR 2 is labeled $SIZE_{t-1}$
FACTOR 3 is labeled $CLIENT\_BUSINESS\_RISK_{t-1}$

Table 8a

Audit Partner General Experience

$REL\_GENERAL\_EXPERIENCE_t = \beta_0 + \beta_1\ REL\_AUDIT\_RISK_{t-1} + \beta_2\ REL\_CLIENT\_BUSINESS\_RISK_{t-1}$
$+ \beta_3\ AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\ REL\_SIZE_{t-1} + \beta_5\ WORKS\_COUNCIL_{t-1} + \beta_6\ CONTROL\_PROBLEM_{t-1}$
$+ \beta_7\ BIGN + \beta_8\ (REL\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\ (REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN)$
$+ \beta_{10}\ (REL\_AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\ (SIZE_{t-1} * BIGN) + \beta_{12}\ (WORKS\_COUNCIL_{t-1} * BIGN)$
$+ \beta_{13}\ (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\ YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.$

		Big N clients	Non-Big N clients	All companies
		n=2,242	n=312	n=2,554
Variables	Exp. Sign	Coefficient	Coefficients	Coefficient
$REL\_AUDIT\_RISK_{t-1}$	+	-.015(-.07)	.829(2.60)**	.847(2.80)***
$REL\_CLIENT\_BUSINESS\_RISK_{t-1}$	+	.059(.27)	-.068(-.13)	-.078(-.15)
$AUDITOR\_BUSINESS\_RISK_{t-1}$	+	4.779(3.59)***	2.541(1.61)	3.502(2.83)***
REL_SIZE_{t-1}	?	-.069(-.37)	-.397(-1.04)	-.475(-1.29)
$WORKS\_COUNCIL_{t-1}$	?	.348(.78)	1.084(1.06)	1.342(1.41)
$CONTROL\_PROBLEM_{t-1}$	+	.351(.38)	1.719(.93)	1.109(.57)
BIGN	?	--	--	-.007(-.01)
$REL\_AUDIT\_RISK_{t-1} * BIGN$	?	--	--	-.863(-2.28)**
$REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN$	?	--	--	.138(.25)
$AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN$	?	--	--	1.312(.77)
$REL\_SIZE_{t-1} * BIGN$	?	--	--	.408(.99)
$WORKS\_COUNCIL_{t-1} * BIGN$	?	--	--	-1.005(-.96)
$CONTROL\_PROBLEM_{t-1} * BIGN$	?	--	--	-.612(-.30)
INTERCEPT		-.045(-.06)	-1.791(-.81)	-.270(-.27)
R-SQUARE		.02024	.03345	.01778
F-VALUE		1.97**	4.34***	5.61***

$REL\_GENERAL\_EXPERIENCE_t$	= $GENERAL\_EXPERIENCE_t$ of the engagement partner – the average $GENERAL\_EXPERIENCE_t$ of all partners from the same audit firm in the sample in year t.
$REL\_AUDIT\_RISK_{t-1}$	= $AUDIT\_RISK_{t-1}$ of the client company – average $AUDIT\_RISK_{t-1}$ of all company clients within the sample which are audited by the same audit firm in year t.
$REL\_CLIENT\_BUSINESS\_RISK_{t-1}$	= $CLIENT\_BUSINESS\_RISK_{t-1}$ of the client company – average $CLIENT\_BUSINESS\_RISK_{t-1}$ of all company clients within the sample which are audited by the same audit firm in year t.
$AUDITOR\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating whether 1 if the client company was listed on the Belgian stock exchange in year t-1, 0 otherwise.
REL_SIZE_{t-1}	= $SIZE_{t-1}$ of the client Company– average $SIZE_{t-1}$ of all company clients within the sample which are audited by the same audit firm, for year t.
$WORKS\_COUNCIL_{t-1}$	= Dummy variable indicating 1 if the client company required a works council, 0 otherwise.
$CONTROL\_PROBLEM_{t-1}$	=Dummy variable indicating 1 if an internal control problem was reported in year t-1, 0 otherwise.

BIGN	= Dummy variable indicating whether the client company is audited by a BIGN audit firm (1) or not (0).
YEAR_DUMMIES_2000-2006	= Dummy variables for each of the fiscal years 2000-2006.

*= Significant at the 10 percent level.
**= Significant at the 5 percent level.
***= Significant at the 1 percent level.
The values between brackets denote the t-values.

Table 8b

Audit Partner Industry Experience

$$REL\_INDUSTRY\_EXPERTISE_{i,t} = \beta_0 + \beta_1\ REL\_AUDIT\_RISK_{t-1} + \beta_2\ REL\_CLIENT\_BUSINESS\_RISK_{t-1} + \beta_3\ AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\ REL\_SIZE_{t-1} + \beta_5\ WORKS\_COUNCIL_{t-1} + \beta_6\ CONTROL\_PROBLEM_{t-1} + \beta_7\ BIGN + \beta_8\ (REL\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\ (REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{10}\ (REL\_AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\ (SIZE_{t-1} * BIGN) + \beta_{12}\ (WORKS\_COUNCIL_{t-1} * BIGN) + \beta_{13}\ (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\ YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.$$

		Big N clients	Non-Big N clients	All companies
		n=2,242	n=312	n=2,554
Variables	Exp. Sign	Coefficient	Coefficients	Coefficient
$REL\_AUDIT\_RISK_{t-1}$	+	-.006(-.59)	.036(1.85)*	.036(1.86)*
$REL\_CLIENT\_BUSINESS\_RISK_{t-1}$	+	-.017(-1.59)	-.004(-.17)	-.004(-.16)
$AUDITOR\_BUSINESS\_RISK_{t-1}$	+	-.037(-.75)	-.013(-.33)	-.013(-.30)
REL_SIZE_{t-1}	?	.000(.07)	.011(.60)	.012(.66)
$WORKS\_COUNCIL_{t-1}$	?	-.053(-3.84)***	-.026(-.69)	-.030(-.78)
$CONTROL\_PROBLEM_{t-1}$	+	-.082(-3.00)***	.002(.06)	.010(.47)
BIGN	?	--	--	.021(1.31)
$REL\_AUDIT\_RISK_{t-1} * BIGN$	?	--	--	-.042(-1.92)*
$REL\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN$	?	--	--	-.013(-.53)
$AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN$	?	--	--	-.024(-.37)
$REL\_SIZE_{t-1} * BIGN$	?	--	--	-.011(-.59)
$WORKS\_COUNCIL_{t-1} * BIGN$	?	--	--	-.023(-.58)
$CONTROL\_PROBLEM_{t-1} * BIGN$	?	--	--	-.094(-3.15)***
INTERCEPT		.018(.89)	.020(.78)	-.001(-.03)
R-SQUARE		.02233	.03710	.02366
F-VALUE		3.98***	7.51***	10.93***

$REL\_INDUSTRY\_EXPERTISE_{i,t}$	= $INDUSTRY\_EXPERTISE_{i,t}$ of the engagement partner – the average $INDUSTRY\_EXPERTISE_{i,t}$ of all partners from the same audit firm in the sample in year t.
$REL\_AUDIT\_RISK_{t-1}$	= $AUDIT_RISK_{t-1}$of the client company – average $AUDIT\_RISK_{t-1}$ of all company clients within the sample which are audited by the same audit firm in year t.
$REL\_CLIENT\_BUSINESS\_RISK_{t-1}$	= $CLIENT\_BUSINESS\_RISK_{t-1}$ of the client company – average $CLIENT\_BUSINESS\_RISK_{t-1}$ of all company clients within the sample which are audited by the same audit firm in year t.
$AUDITOR\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating whether 1 if the client company was listed on the Belgian stock exchange in year t-1, 0 otherwise.
REL_SIZE_{t-1}	= $SIZE_{t-1}$ of the client Company– average $SIZE_{t-1}$ of all company clients within the sample which are audited by the same audit firm, for year t.
$WORKS\_COUNCIL_{t-1}$	= Dummy variable indicating 1 if the client company required a works council, 0 otherwise.
$CONTROL\_PROBLEM_{t-1}$	=Dummy variable indicating 1 if an internal control problem was reported in year t-1, 0 otherwise.

BIGN	= Dummy variable indicating whether the client company is audited by a BIGN audit firm (1) or not (0).
YEAR_DUMMIES_2000-2006	= Dummy variables for each of the fiscal years 2000-2006.

*= Significant at the 10 percent level.
**= Significant at the 5 percent level.
***= Significant at the 1 percent level.
- The values between brackets denote the t-values.
- The coefficients for the year dummies are not reported.

Table 9a

Logistic Regression: Audit Partner General Experience

$$AM\_GENERAL\_EXPERIENCE_{i,t} = \beta_0 + \beta_1\, AM\_AUDIT\_RISK_{t-1} + \beta_2\, AM\_CLIENT\_BUSINESS\_RISK_{t-1} + \beta_3\, AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\, AM\_SIZE_{t-1} + \beta_5\, WORKS\_COUNCIL_{t-1} + \beta_6\, CONTROL\_PROBLEM_{t-1} + \beta_7\, BIGN + \beta_8\, (AM\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\, (AM\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{10}\, (AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\, (AM\_SIZE_{t-1} * BIGN) + \beta_{12}\, (WORKS\_COUNCIL_{t-1} * BIGN) + \beta_{13}\, (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\, YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.$$

		Big N clients	Non-Big N clients	All companies
		n=2,242	n=312	n=2,554
Variables	Exp. Sign	Coefficient	Coefficients	Coefficients
$AM\_AUDIT\_RISK_{t-1}$	+	-.013(.02)	.485(3.78)*	.469(3.56)*
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$	+	-.039(.19)	-.093(.14)	-.078(.10)
$AUDITOR\_BUSINESS\_RISK_{t-1}$	+	2.208(8.29)***	13.391(.00)	11.576(.00)
AM_SIZE_{t-1}	?	-.015(.02)	.440(2.67)	.375(1.99)
$WORKS\_COUNCIL_{t-1}$	?	.071(.34)	.318(.64)	.454(1.34)
$CONTROL\_PROBLEM_{t-1}$	+	-.558(.20)	.825(.32)	.711(.25)
BIGN	?	--	--	.679(6.97)***
$AM\_AUDIT\_RISK_{t-1}$ * BIGN	?	--	--	-.482(3.34)*
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$* BIGN	?	--	--	.040(.02)
$AUDITOR\_BUSINESS\_RISK_{t-1}$ *BIGN	?	--	--	-9.355(.00)
AM_SIZE_{t-1} * BIGN	?	--	--	-.389(1.88)
$WORKS\_COUNCIL_{t-1}$* BIGN	?	--	--	-.387(.89)
$CONTROL\_PROBLEM_{t-1}$* BIGN	?	--	--	-1.241(.43)
INTERCEPT		.048(.11)	-.996(6.45)**	-.674(6.56)**
Max Rescaled R Square		.0297	.0779	.0318
Hosmer and Lemeshow Statistic		3.6384(0.8882)	8.9530(0.3463)	3.1916(0.9218)

$AM\_GENERAL\_EXPERIENCE_t$	= Dummy variable indicating 1 if the general experience of the engagement partner in year t is higher than the average industry expertise of all partners from the same audit firm in the sample in year t.
$AM\_AUDIT\_RISK_{t-1}$	= Dummy variable indicating 1 (0) if the audit risk of the client company in year t-1 is higher (equal or lower) than the average audit risk for year t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating 1 (0) if the audit risk of the client company in year t-1 is higher (equal or lower) than the average audit risk for year t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$AUDITOR\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating whether a client company was listed on the Belgian stock exchange in year t-1.
AM_SIZE_{t-1}	= Dummy variable indicating 1 (0) if the size of the client company in year t-1 is higher (equal or lower) than the average size for year

	t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$WORKS\_COUNCIL_{t-1}$	= Dummy variable indicating whether a client company had more than 100 employees, and therefore required a works council.
$CONTROL\_PROBLEM_{t-1}$	= Dummy variable indicating whether an internal control problem was reported in year t-1.
BIGN	= Dummy variable indicating whether an internal control problem was reported in year t-1.
YEAR_DUMMIES_2000-2006	= Dummy variables for years 2000-2006

*= Significant at the 10 percent level.
**= Significant at the 5 percent level.
***= Significant at the 1 percent level.
- The values between brackets denote the Wald Chi-Square Statistics.
- The coefficients for the year dummies are not reported.

Table 9b

Logistic Regression: Audit Partner Industry Expertise

$$AM\_INDUSTRY\_EXPERTISE_{i,t} = \beta_0 + \beta_1\ AM\_AUDIT\_RISK_{t-1} + \beta_2\ AM\_CLIENT\_BUSINESS\_RISK_{t-1} + \beta_3\ AUDITOR\_BUSINESS\_RISK_{t-1} + \beta_4\ AM\_SIZE_{t-1} + \beta_5\ WORKS\_COUNCIL_{t-1} + \beta_6\ CONTROL\_PROBLEM_{t-1} + \beta_7\ BIGN + \beta_8\ (AM\_AUDIT\_RISK_{t-1} * BIGN) + \beta_9\ (AM\_CLIENT\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{10}\ (AUDITOR\_BUSINESS\_RISK_{t-1} * BIGN) + \beta_{11}\ (AM\_SIZE_{t-1} * BIGN) + \beta_{12}\ (WORKS\_COUNCIL_{t-1} * BIGN) + \beta_{13}\ (CONTROL\_PROBLEM_{t-1} * BIGN) + \beta_{14\text{-}20}\ YEAR\_DUMMIES\_2000\text{-}2006 + \epsilon.$$

		Big N clients	Non-Big N clients	All companies
		n=2,242	n=312	n=2,554
Variables	Exp. Sign	Coefficient	Coefficients	Coefficients
$AM\_AUDIT\_RISK_{t-1}$	+	.154(3.18)*	.433(2.94)*	.433(2.95)*
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$	+	-.045(.27)	.213(.69)	.209(.67)
$AUDITOR\_BUSINESS\_RISK_{t-1}$	+	-1.361(3.14)*	-12.592(.00)	-10.608(.00)
AM_SIZE_{t-1}	?	-.012(.02)	.117(.19)	.118(.19)
$WORKS\_COUNCIL_{t-1}$	?	-.578(22.85)**	-.505(1.23)	-.494(1.21)
$CONTROL\_PROBLEM_{t-1}$	+	-.621(.25)	-13.648(.00)	-11.440(.00)
BIGN	?	--	--	1.143(19.44)***
$AM\_AUDIT\_RISK_{t-1}$ * BIGN	?	--	--	-.279(1.10)
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$* BIGN	?	--	--	-.254(.88)
$AUDITOR\_BUSINESS\_RISK_{t-1}$ *BIGN	?	--	--	9.246(.00)
AM_SIZE_{t-1} * BIGN	?	--	--	-.130(.21)
$WORKS\_COUNCIL_{t-1}$* BIGN	?	--	--	-.083(.03)
$CONTROL\_PROBLEM_{t-1}$* BIGN	?	--	--	10.818(.00)
INTERCEPT		.009(.00)	-1.072(7.11)***	-1.126(17.71)***
Max Rescaled R Square		.0295	.0413	.0481
Hosmer and Lemeshow Statistic		5.7957(0.6701)	10.3783(0.2395)	4.2040(08383)

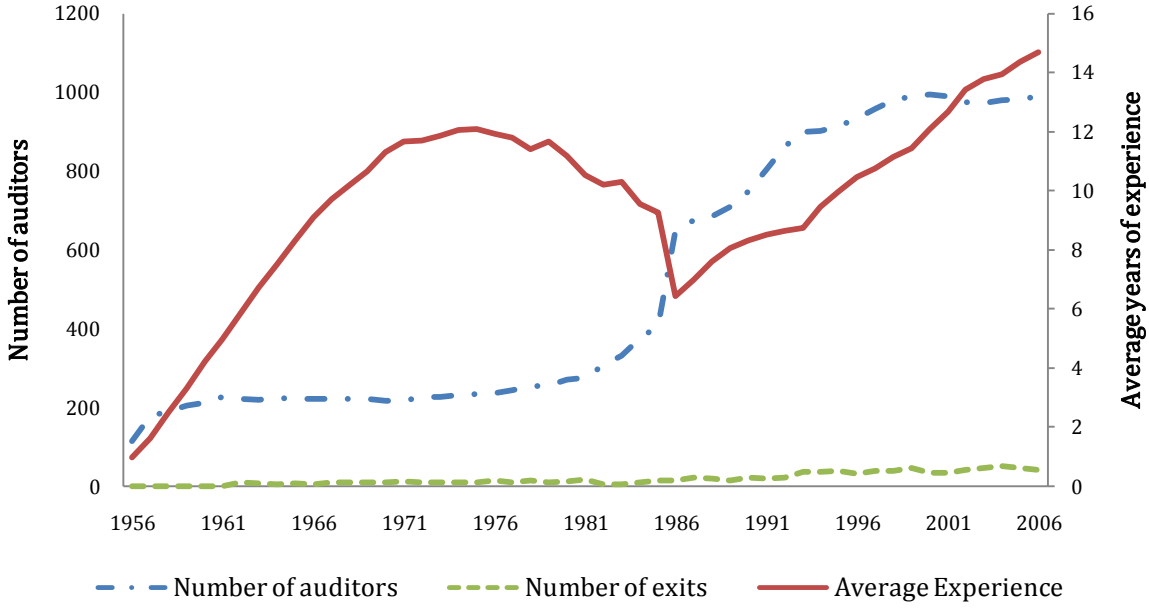
$AM\_INDUSTRY\_EXPERTISE_{i,t}$	= Dummy variable indicating 1 if the industry expertise of the engagement partner in year t is higher than the average industry expertise of all partners from the same audit firm in the sample in year t.
$AM\_AUDIT\_RISK_{t-1}$	= Dummy variable indicating 1 (0) if the audit risk of the client company in year t-1 is higher (equal or lower) than the average audit risk for year t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$AM\_CLIENT\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating 1 (0) if the audit risk of the client company in year t-1 is higher (equal or lower) than the average audit risk for year t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$AUDITOR\_BUSINESS\_RISK_{t-1}$	= Dummy variable indicating whether a client company was listed on the Belgian stock exchange in year t-1.
AM_SIZE_{t-1}	= Dummy variable indicating 1 (0) if the size of the client company in year t-1 is higher (equal or lower) than the average size for year

	t-1 of all company clients within the sample which are audited by the same audit firm in the same fiscal year.
$WORKS\_COUNCIL_{t-1}$	= Dummy variable indicating whether a client company had more than 100 employees, and therefore required a works council.
$CONTROL\_PROBLEM_{t-1}$	= Dummy variable indicating whether an internal control problem was reported in year t-1.
BIGN	= Dummy variable indicating whether an internal control problem was reported in year t-1.
YEAR_DUMMIES_2000-2006	= Dummy variables for years 2000-2006

*= Significant at the 10 percent level.
**= Significant at the 5 percent level.
***= Significant at the 1 percent level.
- The values between brackets denote the Wald Chi-Square Statistics.
- The coefficients for the year dummies are not reported.

Figures

Figure 1: Development of the Belgian Audit Market



Appendix A: Description of IBR Membership Lists

In Belgium, every auditor has to be registered with the IBR, the Belgian institute of auditors. From 1961 onwards the IBR has, as part of their annual report, provided an annual overview of the auditors registered at the institute.

Besides giving an overview of the names of the registered auditors, these membership lists provide information on the date of first registration as an auditor, the spoken language of the auditors (Dutch or French), the audit firm they are associated with and their function within this firm. Since the year of the first registration is given, this makes it possible to calculate the years of experience of auditors, back until 1956[18]. From the membership lists it shows that 1956 was the first year in which two auditors merged forces into one audit firm. From this year onwards the membership lists could also be used to provide insight into audit firm structures. Additional information regarding audit firms is provided since 1972, in an additional overview (List B). In this year the IBR first provided an overview of the audit firms that were registered at the institute, providing, amongst others, also information regarding the location of the audit firm.

From 1988 onwards, the membership lists provided more detailed information about the position of auditors within audit firms, distinguishing partners and employees. From 1989 onwards the membership lists further distinguished managers.

In 1994 the audit firm structures became more complex, showing subsidiaries within audit firm organizations and the use of privately owned companies by auditors, used to acquire capital. To obtain insight into the primary audit firm an auditor is associated with (i.e. the firm that is actually used when signing the auditor's report), as opposed to the firm used to obtain capital or subsidiary, it is required to match auditors to the appropriate primary firm, as described in the next section.

[18] Only for those auditors that were still active in 1961. No information is available for auditors which left the profession before the end of 1961.

Appendix B - Overview of Data Selection Steps

This study relies on data from two sources, which have to be matched. This section discusses steps that are taken take to match the two databases and to prepare the data for the regression analyses.

- In case that there are multiple audit partners or audit firms observations per audit client, then those audit partners are removed that are not active anymore according to the IBR (i.e. no longer registered in the IBR membership lists)
- In case that there are multiple audit partners or audit firms observations per audit client, then those audit partners and those audit firms are removed for which the mandate starts in the future.
- In case that there still are multiple audit partners or audit firms observations per audit client, then those audit partners and those audit firms are removed for which the appointment date plus 3 years does not include the fiscal year, under the condition that for one of the other partners/firms the mandate matches the fiscal year.
- If an audit partner is allocated according to the database to belong to multiple audit firms within one year (could be due to spelling issues), then the firm id for this partner is changed to that firm which is most often mentioned for this partner, within the same year (ignoring cases where the firm id was originally unknown, or for which there are multiple partners)
- If still no audit firm is known for a partner, then the firm id as mentioned on the membership lists is used. The identification of the appropriate firm based on the membership lists is discussed in the next section.

Matching procedure

Matching auditors from the first firm mentioned in membership lists, to a parent firm is done based on audit firm structures as described in the second part of the membership lists. A number of rules are used to complete this matching, since it is possible for an auditor to be mentioned as a partner or manager of multiple firms, while a firm can also be a subsidiary of multiple firms, resulting in sometimes complex audit firm structures.

Whether an audit firm is merged with a parent company depends on the number of partners and managers that are listed for both the parent company and the subsidiary. When the total of partners and managers listed at the parent company exceeds the total of partners and managers listed at the subsidiary, then for those auditors working at the subsidiary, the parent company is recoded to be their primary firm.

If an audit firm is listed as a subsidiary of multiple audit firms whose total number of partners and managers is at least equal to the total of partners and managers working at the subsidiary, then the firm with the largest total number is classified as the primary firm of the partners working at the subsidiary. The other audit firms are classified as secondary matched firm, tertiary matched firm, etc., based on the total number of partners and managers listed in the membership lists.

When the number of partners plus managers at the parent company is smaller than this number for the subsidiary, then the subsidiary is classified as the auditor's primary firm. When a match does not occur according to the size rule, then a parent company is only classified as a secondary audit firm if the partner is directly mentioned as a partner or manager for this firm.

An auditor is classified as a partner of the parent firm, either if he or she is directly listed as a partner of this firm, or if he is a partner in a firm that is merged with the parent firm. An auditor is only classified to be a manager of an audit firm if he is directly mentioned as a manager of the parent firm.

Mid-level firms are added to database (as tertiary, etc.) to maintain links between firms, which allows classifying auditors as partners, even though they are not direct partners of a firm, but only through associated firms.

If there are auditors remaining after merging a group of linked firms, this procedure is repeated, while ignoring the people who are already merged to another firm.

Appendix C

Number of observations per industry

n=74,730

NACE 2 digit industry code	Description	Number of observations
10	Mining of coal and lignite; extraction of peat	112
11	Extraction of crude petroleum and natural gas; service activities incidental to oil surveying and gas extraction excluding	104
12	Coal mining	126
13	Mining of metal ores	37
14	Other mining and quarrying	413
15	Manufacture of food products and beverages	2,726
16	Manufacture of tobacco products	85
17	Manufacture of textiles	1,420
18	Manufacture of wearing apparel; dressing and dyeing of fur	352
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	56
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and manufacture plaiting materials	497
21	Manufacture of pulp, paper and paper products	547
22	Publishing, printing and reproduction of recorded media	1,337
23	Manufacture of coke, refined petroleum products and nuclear fuel	92
24	Manufacture of chemicals and chemical products	1,729
25	Manufacture of rubber and plastic products	1,060
26	Manufacture of other non-metallic mineral products	1,430
27	Manufacture of basic metals	604
28	Manufacture of fabricated metal products, except machinery and equipment	2,031
29	Manufacture of machinery and equipment n.e.c.	1,457
30	Manufacture of office machinery and computers	93
31	Manufacture of electrical machinery and apparatus n.e.c.	543
32	Manufacture of radio, television and communication equipment and apparatus	265
33	Manufacture of medical, precision and optical instruments, watches and clocks	310
34	Manufacture of motor vehicles, trailers and semi-trailers	574
35	Manufacture of other transport equipment	161
36	Manufacture of furniture; manufacturing n.e.c.	987
37	Recycling	352
45	Construction	4,243
50	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	2,964
51	Wholesale and retail trade, with the exception of repair of motor vehicles and motorcycles	20,969

52	Retail trade, with the exception of repair of motor vehicles and motorcycles; repair of household goods	2,788
55	Hotels and restaurants	675
60	Land transport; transport via pipelines	2,379
61	Water transport	196
62	Air transport	64
63	Supporting and auxiliary transport activities; activities of travel agencies	3,070
64	Post and telecommunications	386
70	Real estate, renting and business activities	4,218
71	Sellers of machinery and equipment without operator and of personal and household goods	663
72	Computer and related activities	1,705
73	Research and development	113
74	Other business activities	8,766
75	Public administration and defence; compulsory social security	55
80	Education	109
85	Health and social work	303
90	Sewage and refuse disposal, sanitation and similar activities	406
91	Activities of membership organization n.e.c.	18
92	Recreational, cultural and sporting activities	760
93	Other service activities	341
95	Private households with employed persons	2
99	Extra-territorial organizations and bodies	37
Total		74,730