The Riskiness of Large Audit Firm Client Portfolios and Changes in Audit Liability Regimes: Evidence from the U.S. Audit Market*

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Abstract

We investigate whether the financial riskiness of large U.S. audit firm clienteles varied with the changing audit litigation liability environment during the period 1975–99. Partitioning the period of study into four distinct periods (a benchmark period (1975–84), a period of increasing concerns about litigation liability (1985–89), a period of lobbying for reform (1990–94), and a post-relief period (1995–99)), we find some evidence of risk decreases during 1985–89, strong evidence of risk decreases during 1990–94, and strong evidence of risk increases during 1995–99. However, we also find that over the period of our study, a time during which Big 6 market shares grew appreciably, the proportion of litigious-industry clients in Big 6 client portfolios grew at about the same rate as the proportion of such clients in the population. Moreover, the Big 6 share of the financially riskiest clients in the economy did not grow as fast as the overall Big 6 market share. In sum, although our evidence is consistent with the hypothesis that the riskiness of Big 6 client portfolios responded to changes in the audit litigation liability environment, we find no systematic evidence of a "race to the bottom" or "bottom fishing" by these firms in a bid to increase their market shares.

Keywords Audit clienteles; Audit litigation reform; Client quality; Financial ratios

JEL Descriptors K22, L11, L13, L84, M4

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Le degré de risque associé aux portefeuilles de clients des grands cabinets d'expertise comptable et les modifications apportées aux régimes de responsabilité en matière de vérification : constatations sur le marché de la vérification aux États-Unis

Condensé

Les auteurs de la présente étude exposent des faits relatifs aux changements survenus dans certaines caractéristiques du risque associé aux clientèles des grands cabinets d'expertise comptable des États-Unis, entre 1975 et 1999. Au cours de cette période, le contexte de responsabilité en cas de litige dans lequel se trouvaient les vérificateurs aux États-Unis a connu d'importantes transformations. À partir du milieu des années 1980, les préoccupations relatives à la responsabilité du vérificateur se sont beaucoup accentuées. Autour de 1989, les chefs de file des cabinets d'expertise comptable (les Six Grands) ont commencé à faire circuler une déclaration de principes mettant en relief les répercussions préjudiciables des règles qui prévalaient à l'époque, en matière de responsabilité des vérificateurs, sur l'offre potentielle de services de vérification aux entreprises clientes de modeste taille, présentant des risques. Ces préoccupations ont mené la profession d'expertise comptable à faire pression pour que des modifications soient apportées aux normes, tant professionnelles que juridiques, relatives à la responsabilité des vérificateurs, et les cinq années suivantes (1990 à 1994) ont été marquées par l'opération d'une série de changements importants dans les règles professionnelles touchant la constitution en société et la responsabilité juridique des vérificateurs aux termes de diverses lois, une transformation qui a culminé avec l'adoption de la *Private Securities Litigation Reform Act* (PSLRA) de 1995. Les auteurs, qui utilisent comme période repère la décennie 1975–1984, étudient les variations du degré de risque associé aux clientèles des grands cabinets d'expertise comptable aux États-Unis et de la composition de ces clientèles, durant trois périodes intermédiaires : 1985 à 1989, 1990 à 1994 et 1995 à 1999. Le principal apport de cette étude est de permettre une meilleure compréhension de la façon dont les clientèles des grands cabinets d'expertise comptable ont évolué par suite des transformations du contexte de responsabilité en cas de litige aux États-Unis.

Bien que les chercheurs aient été nombreux à s'intéresser à la pression exercée sur les vérificateurs, au fil des ans, par les modifications apportées à leur responsabilité juridique, deux études seulement ont porté directement sur le lien entre le risque associé aux clientèles des cabinets d'expertise comptable et la pression exercée par l'évolution de la responsabilité des vérificateurs en cas de litige. Il a été établi dans les études précédentes que la probabilité que de grands cabinets offrent leurs services aux petites entreprises de fabrication était plus faible en 1994 qu'en 1987, ce qui confirme que la pression accrue des litiges rend les vérificateurs des grands cabinets plus prudents dans l'acceptation de missions auprès de clients « risqués ». Plus encore, certains chercheurs ont affirmé qu'un examen du risque associé aux clientèles des grands cabinets entre 1976 et 1996 n'avait permis de relever aucun fait récurrent portant à croire que les Six Grands auraient instauré des critères de sélection plus rigoureux (c'est-à-dire qu'ils se seraient associés à des clients moins risqués) au cours de la période postérieure à 1990. L'étude des auteurs enrichit les travaux précédents grâce à l'examen d'un échantillon élargi de clients des services de vérification sur une période plus longue et à l'utilisation de multiples mesures du risque outre celle de l'appartenance à un secteur d'activité. Ainsi les auteurs peuvent-ils tracer un portrait plus général de la dynamique

de la clientèle des Six Grands. La présente étude diffère des études antérieures principalement en ce que les auteurs subdivisent la période postérieure à 1990 en deux périodes intermédiaires distinctes (selon la description qui précède) pour lier plus étroitement les variations du degré de risque associé aux clientèles des cabinets d'expertise comptable à l'évolution du contexte des litiges durant les années 1990.

Les auteurs posent l'hypothèse des changements prévus suivants dans le degré de risque lié à la clientèle des services de vérification : s'il est vrai que le contexte des litiges du milieu à la fin des années 1980 a rendu relativement peu attrayante pour les grands cabinets d'expertise comptable l'acceptation de missions de vérification auprès de clients risqués, les grands cabinets auront pris des mesures pour éviter (c'est-à-dire congédier ou refuser) les clients risqués à la fin des années 1980 (1985 à 1989) davantage que dans les années précédentes. Les auteurs s'attendent donc à observer une diminution du risque associé aux clients des Six Grands au cours de cette période. La période du début des années 1990 (1990 à 1994) se caractérise par des attentes mixtes, car même si certaines réformes étaient alors en voie d'adoption, ces mesures n'avaient pas encore été pleinement mises en œuvre, de sorte que les préoccupations des vérificateurs relatives aux réformes (et leurs activités de lobbying dans ce domaine) sont demeurées assez vives au cours de cette période. Les auteurs s'attendent donc à constater soit l'absence de changement soit une réduction croissante du degré de risque associé aux clients des Six Grands au cours de la période 1990–1994. Enfin, s'il est vrai que les réformes du début et du milieu des années 1990 ont réduit l'exposition (des vérificateurs) aux risques associés aux clients plus risqués des services de vérification, les grands cabinets auront recherché (conservé ou recruté) les clients risqués plus activement durant la période postérieure à la réforme (soit après 1994). Les auteurs s'attendent conséquemment à relever une augmentation du degré de risque associé aux clients des Six Grands durant cette période.

Pour analyser ces hypothèses, les auteurs procèdent à une régression de multiples mesures du risque financier associé aux clients sur des variables indicatrices liées au type de client, à la période, aux caractéristiques sectorielles et à la nature de l'opinion du vérificateur, et une mesure constante de la taille de l'entreprise cliente. La comparaison des coefficients de l'interaction entre les indicateurs relatifs au type de client et à la période permet aux auteurs de vérifier les hypothèses directionnelles relatives à la variation du degré de risque global associé aux portefeuilles de clients des Six Grands cabinets d'expertise comptable (et des cabinets prédécesseurs). Étant donné que les distributions des ratios financiers ne sont pas stationnaires dans le temps et subissent l'influence des chocs ressentis par l'ensemble de l'économie et du secteur d'activité, les auteurs procèdent aussi à des analyses semblables à l'aide de mesures du risque financier associé aux clients qui sont ajustées en fonction du secteur d'activité. Sauf une exception importante, les analyses faisant appel soit aux mesures brutes du risque (non ajustées pour tenir compte du secteur d'activité) soit aux mesures du risque ajustées pour tenir compte du secteur d'activité donnent des résultats très similaires. L'analyse faisant appel aux mesures brutes du degré de risque financier associé aux clients révèle que le risque que présentent les portefeuilles de clients des Six Grands a augmenté entre 1985 et 1989 (la période d'accentuation des préoccupations relatives à la responsabilité), diminué entre 1990 et 1994 (la période de lobbying en vue de la réforme) et augmenté après 1994 (la période d'allègement postérieure à la PSLRA). L'analyse faisant appel aux mesures ajustées en fonction du secteur d'activité, en revanche, révèle des *réductions* du risque associé

aux clientèles des Six Grands entre 1985 et 1989, tandis que les résultats des périodes 1990–1994 et 1995–1999 ressemblent aux résultats qui découlent de l'utilisation des mesures brutes du risque. En somme, sauf pour les résultats de 1985–1989 découlant de l'utilisation des mesures brutes du risque, tous les autres résultats, peu importe que les mesures du risque utilisées soient les mesures brutes ou ajustées en fonction du secteur d'activité, sont conformes à l'hypothèse selon laquelle le risque associé aux clientèles des cabinets d'expertise comptable décroît lorsque la pression sur la responsabilité augmente et croît lorsque cette pression s'atténue.

Afin de pousser plus loin l'étude de l'évolution de l'offre, par les Six Grands, de services de vérification aux clients risqués (voir Andersen *et al.*, 1992), les auteurs examinent également la composition sectorielle des clientèles des Six Grands dans le temps. La part du marché globale des cabinets figurant parmi les Six Grands a sensiblement augmenté au cours de la période sur laquelle porte l'étude et dans chaque période intermédiaire. Cette augmentation a-t-elle donné lieu à une hausse de la part des clients particulièrement risqués revenant à ces cabinets ? Les auteurs se penchent sur cette question en utilisant deux substituts différents aux groupes de clients très risqués. Premièrement, en analysant l'offre de services de vérification aux clients dont les secteurs d'activité présentent un potentiel de litiges élevé (et qui sont donc risqués), les auteurs constatent que l'importance de ces secteurs dans le portefeuille de clients des Six Grands a augmenté au cours de la période étudiée. La proportion de clients dont le secteur d'activité est enclin aux litiges dans les portefeuilles de clients des Six Grands passe de 32 % entre 1975 et 1984 à 37 % entre 1985 et 1989, demeure stable au cours de la période 1990–1994 et, après 1994 (soit après la période d'allègement), grimpe de nouveau à 43 %. Toutefois, ces variations sont essentiellement modelées sur celles de la proportion globale que représentent les clients des secteurs d'activité enclins aux litiges dans l'ensemble de l'économie. En d'autres termes, la présence accrue de clients de secteurs d'activité enclins aux litiges dans les clientèles des Six Grands au fil du temps reflète la croissance rapide de la taille de ces secteurs d'activité plutôt qu'une augmentation systématique de la part du marché des Six Grands dans ces secteurs. Deuxièmement, en étudiant l'évolution de la part des clients les plus risqués de l'économie qui échoit aux vérificateurs des Six Grands, les auteurs constatent que, même si la part du marché agrégée des Six Grands passe de 73 % au cours de la période 1975–1984 à 83 % au cours de la période 1995–1999, leur part des clients les plus risqués est sensiblement plus faible dans chaque période et n'augmente pas aussi rapidement que leur part du marché globale. Cette observation réfute le comportement de nivellement vers le bas des Six Grands dans leurs efforts pour augmenter leur part du marché : il semble que les Six Grands aient accepté les clients les plus risqués à un rythme plus lent que celui auquel ils ont augmenté leur part du marché agrégée au cours d'une période durant laquelle cette part du marché a augmenté assez sensiblement (de près de 10 %).

1. Introduction

In this study, we present evidence on changes in some key risk characteristics of large U.S. audit firm clienteles during the period 1975–99. During this period, the litigation liability environment facing U.S. auditors changed substantially. Starting around the mid-1980s, concerns about auditor liability became particularly intense. Around 1989 the leading (then Big 6) audit firms began circulating a position

paper highlighting the adverse impact of then prevalent auditor liability rules on the potential supply of audits to small and risky clients. These concerns led the audit profession to press for changes in both professional and legal standards of auditor liability, and the next five years (1990–94) were marked by a series of significant changes in professional rules on incorporation and auditors' legal liability under various statutes, culminating in the passage of the Private Securities Litigation Reform Act (PSLRA) of 1995.[1] Using the 1975–84 decade as a benchmark, this study investigates changes in the riskiness and composition of large U.S. audit firm clienteles across the three subperiods 1985–89, 1990–94, and 1995–99. Our principal contribution is to provide a better understanding of how large audit firm clienteles changed in response to changes in the U.S. litigation liability environment.

Although there has been considerable research on the changes in litigation liability pressure on auditors over the years (e.g., Kothari, Lys, Smith, and Watts 1988; Lys 1993; Lys and Watts 1994), only two prior studies have directly investigated the link between the riskiness of audit firm clienteles and changes in litigation liability pressure. Jones and Raghunandan (1998) find that the likelihood of large auditors serving small manufacturing firms was lower in 1994 than in 1987, a result they interpret as being consistent with increasing litigation pressure making larger auditors more cautious in accepting risky clients. Francis and Reynolds (2000) examine large audit firm clienteles during 1976–96 and find no consistent evidence that Big 6 firms implemented stricter screening criteria (that is, were associated with less risky clients) during the post-1990 period. Our study extends Jones and Raghunandan by examining a larger sample of audit clients over a longer window and using multiple risk measures in addition to industry membership. This enables us to present a more general picture of Big 6 clienteles dynamics. Our study differs from Francis and Reynolds principally in that we divide the post-1990 period into two distinct subperiods (as described above) to more closely link changes in the riskiness of audit firm clienteles to changes in the litigation environment during the 1990s.

On the basis of arguments spelled out in more detail in section 2, we develop the following hypotheses about expected changes in audit clienteles riskiness: if indeed the litigation environment in the mid-to-late 1980s did make it relatively unattractive for large audit firms to audit risky clients, large auditors would have taken steps to avoid (that is, fired/not accepted) risky clients during the late 1980s (1985–89) than in earlier years. Thus we expect to find a decrease in Big 6 client riskiness during this period. The period of the early 1990s (1990–94) is a period of mixed expectations in that while some reforms were in the process of being enacted, these measures had not yet been fully implemented so that auditor concerns about (and lobbying for) reforms were still quite strong during this period. Thus we expect to find either no change or a continued decrease in Big 6 client riskiness during the 1990–94 period. Finally, if the reforms of the early and mid-1990s did reduce the (auditor's) risk exposure from auditing riskier clients, large auditors would have pursued (retained/added) risky clients more actively during the post-reform (post-1994) period. Thus we expect to find an increase in Big 6 client riskiness during this period.

To investigate these hypotheses, we regress multiple measures of client financial riskiness on indicator variables for client type, time periods, industry characteristics, and type of audit opinion, as well as a continuous measure of client size. Comparing coefficients on the interaction between client type and time period indicators permits us to test directional hypotheses regarding changes in the overall riskiness of Big 6 audit firm client portfolios.[2] Because financial ratio distributions are non-stationary over time and are affected by economy- and industry-wide shocks, we also conduct similar analyses using industry-adjusted client financial risk measures. Except in one significant respect, the analyses using either raw (industry-unadjusted) or industry-adjusted risk measures yield very similar results. The analysis using raw (unadjusted) measures of client financial riskiness reveals that Big 6 client portfolios increased in riskiness during 1985–89 (the period of rising liability concerns), decreased in riskiness during 1990–94 (the period of lobbying for reform), and increased in riskiness after 1994 (the post-PSLRA relief period). The industry-adjusted analysis, on the other hand, shows evidence of risk decreases in Big 6 clienteles during 1985–89 while the results for 1990–94 and 1995–99 are similar to those obtained using raw risk measures. In sum, except for the results for 1985–89 using raw risk measures, all other results, whether using raw or industry-adjusted risk measures, are consistent with the hypothesis that audit firm clienteles become less risky when liability pressure increases and more risky when the pressure abates.

To further investigate changes in the supply of Big 6 audits to risky clients (cf. Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse 1992), we also examine the industry composition of Big 6 clienteles over time. The overall market shares of Big 6 auditors increased substantially during the period of study and in each subperiod. Did this growth result in an increase in the firms' share of particularly risky audit clients? We investigate this question using two different surrogates for groups of highly risky clients. First, investigating the supply of audits to clients in highly litigious (and therefore risky) industries, we find that the importance of these industries in the Big 6 client portfolio has increased over the sample period. The proportion of litigious-industry clients in Big 6 client portfolios increases from 32 percent in 1975–84 to 37 percent in 1985–89, remains constant during 1990–94 and, in the post-1994, post-relief period, jumps again to 43 percent. However, these changes essentially track the change in the overall economy-wide proportion of litigious-industry clients. In other words, the increased presence of litigious-industry clients in Big 6 clienteles over time reflects the rapid growth in the size of these industries rather than the Big 6 systematically increasing their market share of such industries. Second, investigating the changes in Big 6 auditors' share of the riskiest clients in the economy, we find that while the aggregate market share of the Big 6 firms increases from 73 percent during 1975–84 to 83 percent in 1995–99, their share of the riskiest clients is significantly lower in every period and does not rise as fast as their overall market share. This evidence is inconsistent with a race-to-the-bottom approach by the Big 6 firms in their efforts to increase market share: the Big 6 appear to have taken on the riskiest clients at a rate slower than the rate at which

they increased their aggregate market share during a period when their aggregate share grew quite significantly (almost 10 percent).

The rest of the paper is organized as follows: section 2 discusses the changing auditor litigation liability environment facing large U.S. audit firms during the period of our study and develops our research hypotheses. Section 3 discusses measures and tests, section 4 the data, and section 5 the results. Section 6 provides a summary and conclusions.

2. Background and hypotheses

The changing landscape of U.S. auditor litigation liability circa 1980–99

The decade of the 1980s, especially the second half, was marked by a considerable increase in litigation pressure on large audit firms (Arthur Andersen et al. 1992; Public Oversight Board [POB] 1993).[3] Changes in the frequency of lawsuits against auditors as well as increasingly large awards, settlements, and insurance costs during this period were widely reported to be driving the increase in litigation pressure (Berton 1985, McCarroll 1992). The increasing liability pressure during this period led to widespread concerns that major audit firms were "not going to be doing business with companies that [were] at risk … and the general well-being of the public [was] not going to be served because the better talent [was] not going to be out on the most difficult situations" (Chicago Tribune 1987, C8). In 1989, mergers among the erstwhile Big 8 reduced the number of large auditors to six. After reviewing the evidence on litigation pressure, Lys (1993, 342) suggests that the 1989 "mergers among large audit firms may represent … a response to increases in liability". In sum, the mid-to-late 1980s can be characterized as a period of increasing concerns about litigation liability pressure and the adverse impact of this pressure on the supply side of the audit market.

Over the next five years, beginning in the early 1990s, many interested parties, including major audit firms, the American Institute of Certified Public Accountants (AICPA), and affected industry groups conducted an intense lobbying campaign to reduce auditors' legal liability. In 1990, the AICPA proposed allowing member firms to incorporate as limited liability partnerships (Stremba 1990) and, in 1992, 92 percent of the AICPA membership voted to amend rule 505 of the Code of Professional Conduct accordingly (McCarroll 1992).[4] The Big 6 firms all converted to limited liability partnerships soon thereafter. About the same time, the Big 6 firms also issued a widely circulated "position paper" warning that excessive liability exposure might force them to withdraw from audits of risky clients (Arthur Andersen et al. 1992). Such withdrawal, they argued, could retard capital raising by innovative young firms and undermine investor confidence in the financial reporting process (see also POB 1993).[5] Soon thereafter, in 1994, the Supreme Court eliminated auditors' liability for aiding and abetting rule 10b-5 violations (*Central Bank of Denver v. First Interstate Bank of Denver* 1994).[6] Overall, the changes implemented during the first half of the 1990s served to reduce or mitigate the effects of increasing liability pressure on auditors.

In 1995, the Private Securities Litigation Reform Act of 1995 (hereafter, PSLRA) introduced a number of important reliefs for the profession including the

introduction of proportional liability for auditors under tort law in certain circumstances while limiting key aspects of their liability under the 1934 Securities Act and the Racketeer Influenced and Corrupt Organizations Act.[7] Coffee (2001) summarizes the effect of these reliefs as follows: "In sum a credible story can be told that auditors today are subject to less of a legal threat than a decade ago and are, correspondingly subject to a greater temptation to defer to management." Thus the post-1994 period can be treated as a period of relatively reduced pressure due to professional liability concerns.

Hypotheses

To investigate whether the riskiness of Big 6 audit client portfolios changes over time in response to changes in the litigation liability environment, we divide the 1975–99 period into four subperiods, treating the pre-1985 period (period 1) as a benchmark; 1985–89 (period 2) as a period of increasing concern about professional liability exposure; 1990–94 (period 3) as a period of relief with the implementation of AICPA rule changes, court decisions, and successful lobbying for Congressional action (culminating in the enactment of the PSLRA reliefs); and the post-1994 period (period 4) as a period of relaxed concerns about litigation pressure.[8] Our principal hypotheses about the changes in riskiness of audit firm clienteles in response to varying concerns about litigation liability pressure during the various time periods are set out in Figure 1. Because pressures to accept and retain clients may be different, we analyze new, departing, and continuing client subgroups separately.

Figure 1 Directional predictions of overall client subgroup risk changes across time periods

	Time Period		
Subgroup mean tests	Period 2 (1985–89)	Period 3 (1990–94)	Period 4 (1995–99)
Litigation environment	Increasing concerns	Period of reliefs	Post-reliefs
Continuing clients	Less risky than in preceding period (riskiness ↑)	Mixed (riskiness ↑/~/↓)	More risky than in preceding period (riskiness ↓)
New clients	Less risky than in preceding period (riskiness ↑)	Mixed (riskiness ↑/~/↓)	More risky than in preceding period (riskiness ↓)
Departing clients	Less risky than in preceding period (riskiness ↑)	Mixed (riskiness ↑/~/↓)	More risky than in preceding period (riskiness ↓)

Notes:

↑ = improvement (that is, decrease) in client riskiness relative to previous period.

~ = no change in client riskiness relative to previous period.

↓ = deterioration (that is, increase) in riskiness relative to previous period.

We hypothesize that as auditors' concerns about liability exposure increase, they should be more conservative in accepting new assignments and in severing existing client relationships. In other words, we expect that, during period 2, the riskiness of both new and departing client subgroups will improve (that is, decrease) relative to period 1. These shifts will in turn also result in lowering the overall riskiness of the continuing client portfolio during period 2. Period 3 is probably best viewed as one of mixed incentives as the AICPA and Supreme Court decisions get enacted over this time period, but the larger reliefs incorporated in the provisions of the PSLRA are not yet implemented. We therefore expect a similar, or possibly weaker, pattern of risk improvement during period 3 as some of the reliefs lobbied for by auditors get enacted. In the more relaxed post-PSLRA environment of period 4, we expect that auditors will both accept and retain more risky clients than before, leading to a deterioration (that is, an increase) in the riskiness of the overall client portfolio.

The 1992 Big 6 position paper expressed concerns about litigation pressure adversely affecting the ability of Big 6 firms to continue to provide audit services to risky clients. To investigate whether the supply of audits to risky clients varied with changes in auditors' litigation liability environment, we examine Big 6 market shares in litigious industries and in the most-distressed decile of clients in each time period. If Big 6 firms increasingly discard (pursue) risky clients while increasing their overall market share, their shares of these highly risky client segments should grow slower (faster) than their overall market share.

3. Measures and tests

Measuring the changing riskiness of an audit firm's clientele is a complex task because audit risk is a multidimensional construct. In this study, we focus attention only on some widely used measures of financial risk/distress (primarily in order to be able to use the largest possible set of audit clients for which data is available in the COMPUSTAT data base). Our tests examine (1) whether the riskiness of particular subgroups of Big 6 clients changes over time, (2) whether the cutoffs that define the riskiest 10 percent of clients in each subgroup change over time, (3) whether the weight of highly litigious industries in the Big 6 client portfolio changes over time, and (4) whether the Big 6 share of the most risky clients in the economy changes over time.

Measures

We use three commonly used summary measures of client financial distress as our principal indicators of client riskiness. Although financial distress measures do not directly capture auditor litigation exposure, auditor litigation risk is often associated with client financial failure or distress (Stice 1991, Palmrose 1997). In general, predicting client distress involves business strategy analysis, accounting analysis, financial analysis, and prospective analysis (Palepu, Bernard, and Healy 1996, 9–16). In addition, complex interdependencies between client strategy and the environment affect the auditor's business-risk exposure as well (Bell, Marrs, Solomon, and Thomas 1997). However, specific financial characteristics of a client

(for example, liquidity, profitability, etc.) can also help identify particular sources of client risk. We therefore report several measures of client financial health widely used in financial statement analysis as well as prior research on auditor changes (Lev and Thiagarajan 1993; Brealey, Myers, and Marcus 1999) in addition to the three summary distress measures.[9]

Our three summary measures of client financial distress are (1) Altman's (1983) *Z*-score; (2) a modified Altman *Z*-score based on coefficients reported by Shumway 1997 and used in Miller and Skinner 1998; and (3) Zmijewski's 1984 probability of bankruptcy score. The specific dimensions of client financial health examined are (1) liquidity, (2) profitability, (3) activity, (4) solvency, (5) current assets and current liabilities, (6) free cash flow, and (7) measures of client size as measured by total assets, sales and owners' equity — both book and market-based.[10] Table 1 lists all variables and provides the details of COMPUSTAT annual data items used to compute each.

Altman's *Z*-score (*Z*) combines accounting measures of working capital, retained earnings, earnings before interest and tax, sales, total liabilities, and total assets, as well as market value of equity in a summary measure of bankruptcy risk (Altman 1983). This model is widely used in distress prediction, and we use the version applicable to public companies. Shumway (1997) has suggested that the original parameters for the Altman *Z*-score may need updating to account for changes in market risk factors since the early 1980s and suggests alternative weights on Altman's original variables. Following Miller and Skinner 1998, we include Shumway-weighted Altman *Z*-scores (*ZS*) as an alternative summary measure. Our third summary measure is Zmijewski's 1984 probability of bankruptcy score (*ZMJ*), which is based on book values of return on assets, debt to assets, and the current ratio. This measure is widely used as a book-value based metric for assessing bankruptcy risk.

Liquidity measures examine the client's ability to meet its short-term obligations and thus avoid technical default on its obligations. We use the current and quick ratios as measures of liquidity. Profitability measures the client's ability to add value and remain a viable business entity. We use both net profit margin and the ratio of earnings before interest and taxes to total assets to measure profitability. Activity measures are often used as an index of the firm's management of its resources. The receivables/total assets ratio reflects both greater collection risk and the risk of errors or irregularities (Feroz, Park, and Pastena 1991). Similarly, the sales/total assets or asset turnover ratio is used to measure capacity utilization rates, another important performance metric. Low asset turnover ratios indicate heightened competitive pressures on the client's business and therefore greater business (and hence audit) risk. In the longer term, the primary determinant of a client's viability is solvency or the firm's ability to meet its long-term obligations and covenants. We measure solvency using both the ratio of cash flows to total liabilities and the ratio of total liabilities to total assets (the leverage ratio).

In addition to these ratios, we also include in a category called "other", as proxies for managerial discretion over accruals and thus potentially over financial statement misstatement risk, the amount of a firm's current assets and liabilities.[11]

TABLE 1
Variable definitions

Measures of client financial characteristics used in the study. Numbers within square brackets in the right-hand column indicate the data item or combination of data items used in the study to measure the attribute listed in the left-hand column. Definitions of the relevant data items may be found in the COMPUSTAT user's guide. All data used in this study are drawn from the 2000 edition of the COMPUSTAT data base.

Financial characteristics and measures		Definition*
Summary measures†	Altman's *Z* (*Z*) (Altman 1983)	1.2 (*CA-CL*)/*TA* + 1.4 (*RE*/*TA*) + 3.3 *EBITA* + 0.6 (*MVEQ*/*TL*) + 0.998 (*SALES*/*TA*)
	Altman's *Z* with Shumway coefficients (*ZS*) (Shumway 1997)	1.51 (*CA-CL*)/*TA* + 1.0 (*RE*/*TA*) + 6.2 *EBITA* + 0.1 (*MVEQ*/*TL*) + 1.75 (*SALES*/*TA*)
	Zmijewski's distress score (*ZMJ*) (Zmijewski 1984)	−4.336 − 4.512 *EBITA* + 5.679 *TLTA* + 0.004 *CR*
Liquidity	Current ratio (*CR*)	Current assets [14] ÷ Current liabilities [5]
	Quick ratio (*QR*)	Quick assets [1 + 2] ÷ Current liabilities [5]
Profitability	Net profit margin (*NPM*)	Net income [172] ÷ Sales [12]
	Earnings before interest and tax to total assets (*EBITA*)	Earnings before interest and tax [170 + 15] ÷ Total assets [6]
Activity	Receivables to total assets (*RTA*)	Accounts receivable [2] ÷ Total assets [6]
	Sales to total assets (*STA*)	Sales [12] ÷ Total assets [6]
Solvency	Cash flow to total liability (*CFTL*)	Cash flow [123 + 125] ÷ Total liabilities (*TL*) [181]
	Total liability to total assets (*TLTA*)	Total liabilities [181] ÷ Total assets [6]

(The table is continued on the next page.)

TABLE 1 (Continued)

Financial characteristics and measures		Definition*
Other	Current assets (*CA*)	Current assets [14]
	Current liabilities (*CL*)	Current liabilities [5]
Free cash flow	Free cash flow (*FCF*) (Lehn and Poulsen 1989)	Operating income before depreciation [13] – Income taxes [16] – Interest expense [15] – Preferred dividend [19] – Common dividend [21]
Size	Total assets (*TA*)	Total assets [6]
	Sales (*SALES*)	Sales [12]
Owners' equity	Retained earnings (*RE*)	Retained earnings [36]
	Market value of equity (*MVEQ*)	Price close [24] × Common shares outstanding [25]

Notes:

* COMPUSTAT data item numbers shown in square brackets.

† All summary measures are expressed in terms of other variables defined below. Smaller values of *Z* and *ZS* and larger values of *ZMJ* indicate increasing financial distress.

Free cash flow is often used in the literature as another proxy for managers' discretionary spending potential, which may be associated with underinvestment, threatening the long-term viability of the client and/or undisclosed (or misclassified) long-term obligations underlying the client's current cash-rich position. We use a measure of free cash flows widely used in prior research (Lehn and Poulsen 1989; Lang, Stultz, and Walkling 1991). We have no directional predictions on these three measures.

Client size may affect both audit effort and the auditor's risk exposure. The effect of client size on the auditor's risk exposure can go either way. For example, larger clients may be associated with larger damage awards. On the other hand, larger clients may be less risky because they are seasoned and have a well-established business model. Increases in size may also result from growth in the economy. Although we have no directional predictions regarding the association between size and business risk, we use client total assets and sales, both widely used proxies for audit effort in studies of audit market shares and audit pricing (see, e.g., Doogar and Easley 1998; Menon and Williams 2001), as measures of client size. Another class of size measures used in the literature relates to the amount of stockholder wealth at risk. We measure stockholder wealth at risk using both market value of equity and retained earnings. We use retained earnings rather than book value of owners' equity because retained earnings is often used as a measure of the undistributed surplus generated by the past actions of management.

Tests

We measure changes in the overall riskiness of client portfolios in two ways. First, to measure changes in average client subgroup riskiness over time, we regress each summary and disaggregated risk measure on a set of indicator variables for each client-subgroup-and-time-period combination together with controls for client size, audit opinion, and client industry membership (the distribution of risk scores may be a function of client size and client industry and may vary systematically with the type of audit opinion).[12] We also estimate the changes in the riskiest decile cutoffs for each client-subgroup-and-time-period combination by fitting a minimum absolute deviation regression line around the 10th percentile estimated using the same regression model.[13] Our second set of tests focuses on client industry membership. More specifically, we investigate interperiod differences in the proportion of risky-industry clients within the Big 6 client portfolio and in the Big 6 share of the most-risky-client segment of the market. In the rest of this section we explain more fully the regression framework used to conduct the first set of tests.

As auditors become more conservative (aggressive) in accepting and retaining risky clients, the distribution of risk scores for their clients shifts to reflect the lower (higher) risk of the clientele.[14] In other words, significant changes in client riskiness should be reflected in statistically significant differences in the means and/or 10th percentile (riskiest decile) cutoffs of the various risk measures for each client subgroup. To be consistent with our hypotheses, the interperiod differences within each client subgroup should show evidence of risk decreases during period 2 when auditors' concerns about liability exposure become more acute and

evidence of risk increases as various relief measures are implemented or as auditors' liability concerns abate — that is, during period 4.[15]

To test for changes in either means or the 10th percentile cutoffs of risk measures for different client subgroups over time, we use a regression framework that permits us to estimate changes in the mean or in any percentile of the distribution of risk scores after controlling for effects of size and other factors that may affect the distribution of financial ratios, something that cannot easily be done by direct tests of subgroup mean differences. Our regression model is of the form:

$$\begin{aligned} y_{ijt} = {} & b_0 + b_{C2}C2 + b_{C3}C3 + b_{C4}C4 + b_{N1}N1 + b_{N2}N2 + b_{N3}N3 + b_{N4}N4 + b_{D1}D1 \\ & + b_{D2}D2 + b_{D3}D3 + b_{D4}D4 + b_{O1}O1 + b_{O2}O2 + b_{O3}O3 + b_{O4}O4 \\ & + b_{CLEAN}CLEAN + b_{REG}REG + b_{LITIG}LITIG + b_{HITEC}HITEC \\ & + b_{TA}TA_{jt} + \epsilon_{ijt} \end{aligned}$$

where y_{ijt} is the value of the ith financial characteristic or risk measure of the jth client in year t. *C2*, *C3*, *C4*; *N1*, *N2*, *N3*, *N4*; *D1*, *D2*, *D3*, *D4*; and *O1*, *O2*, *O3*, *O4* are indicator variables for specific client-type-and-time-period combinations where the alphabetical component indicates client type and the numerical component the time period. Thus *C2*, *C3*, and *C4* are the indicator variables for continuing Big 6 clients in periods 2, 3, and 4 respectively (*C1* being the omitted or "base" client category), while *N1*, *N2*, *N3*, *N4* and *D1*, *D2*, *D3*, *D4* are corresponding indicator variables for new and departing Big 6 clients and *O1*, *O2*, *O3*, *O4* are the indicator variables for continuing non–Big 6 clients in periods 1 through 4. *CLEAN*, *REG*, *LITIG*, and *HITEC* are indicator variables for clean auditor opinion and client industry membership, and *TA* is a control for client size.[16] *CLEAN* takes the value 1 if the auditor issues a clean opinion, 0 otherwise; *REG* takes the value 1 if the firm is in a regulated industry as defined in Hogan and Jeter 1999, 0 otherwise; *LITIG* is 1 if the firm is in a litigious industry as defined in Hogan and Jeter, 0 otherwise; and *HITEC* is 1 if the firm is in a high-technology industry as defined in Kasznik and Lev 1995, 0 otherwise.

The indicator variables for each client-type-and-time-period combination are our treatment variables while audit opinion, client membership in select industries, and client size are best thought of as controls. Coefficients on the indicator variable for each client-type-and-time-period combination measure the incremental riskiness of that client-type-period combination relative to pre-1985 continuing Big 6 clients. Consequently, changes in the mean or 10th percentile risk scores of different client subgroups over time after controlling for audit opinion, industry characteristics, and client size can be tested as differences in the coefficient values for the corresponding client-type-and-time-period combinations.

4. Data

Because the changes in litigation liability pressure during the period of study largely concerned audits of publicly traded clients, we would ideally like to study the financial risk characteristics of all public clients of Big 6 audit firms. Virtually all publicly traded clients with any significant market capitalization (and therefore

likely to be a source of substantive litigation liability pressure due to substantial investor losses) are included in the Standard & Poor's COMPUSTAT data base. Hence our sample consists of all companies included in the 2000 (all-inclusive) COMPUSTAT data base for which auditor information and the other required data items were available for at least one year. This sample represents approximately 80 percent of all COMPUSTAT listings for which both the auditor identity and several key variables (net income, total assets, sales, market value of equity) are available in any year.

Our sample comprises a total of 143,157 client-year observations. Table 2 shows the distribution of clients based on the client's COMPUSTAT listing status and auditor affiliation. In each year, clients listed on COMPUSTAT for at least one prior year are called continuing (COMPUSTAT) listings while clients first listed on COMPUSTAT in that year are called initial listings. Columns 2 and 5 of Table 2 show the number of continuing listings that do not change auditor type (Big 6 or non–Big 6) from the previous year (including clients changing auditor affiliation but not auditor type). Column 3 lists new Big 6 clients — that is, clients switching from a non–Big 6 auditor to a Big 6 auditor, while column 4 lists departing Big 6 clients — that is, clients switching from a Big 6 auditor to a non–Big 6 auditor. Columns 8 and 9 show initial listings, classified by auditor type (Big 6 or non–Big 6).

The initial listings in our sample most likely consist largely of new SEC registrants (for example, initial public offerings [IPOs]).[17] However, in addition to IPOs, initial listings may include firms already traded but for which coverage has been newly initiated, or they may include spin-offs, equity carveouts, and initial public offerings of tracking stock. Absent auditor information for the prelisting period, we cannot unambiguously classify these clients in any of the four categories listed in columns 2–5 and therefore list them separately in columns 8 and 9 of Table 2. In our subsequent analysis we treat initial listings as if they were new Big 6 or new non–Big 6 clients.[18]

Table 3 reports means, medians, and standard deviations of the variables for each of the four periods under study. For all variables, except *RTA* (receivables to total assets) and *STA* (sales to total assets), the standard deviations are much larger than the means for any period and a number of variables have extreme outliers. The means and medians reported in Table 3 suggest an overall increase in the riskiness of the entire sample over time. For instance, the median Altman *Z*-score (median Shumway *ZS*-score), which is decreasing in the probability of bankruptcy, decreases from 3.38 (4.54) in period 1 to 2.83 (3.28) in period 4. The median Zmijewski *ZMJ* score, which is increasing in the probability of bankruptcy, increases from −1.78 in period 1 to −1.38 in period 4. Similar patterns of increasing riskiness are observed consistently throughout Table 3.

Table 3 reports only descriptive statistics for the entire sample. Results (not reported) of intraperiod means comparisons using Wilcoxon rank sum tests show that, on average, continuing Big 6 clients are less risky than all other client subgroups and new Big 6 are less risky than departing Big 6 clients.[19] The tests reported in section 5 investigate the differences in measures for each client subgroup across time periods after controlling for client size and client industry characteristics.

TABLE 2
Audit firm clientele size by period and auditor affiliation

For the period 1975 to 1999, clients are classified on the basis of their auditor affiliation in the year shown in column 1 and the immediately preceding year, as explained in the notes below. Clients consist of all COMPUSTAT (2000 all-inclusive tape) listings for which data on auditor identity and the required variables listed in Table 1 are available for at least one year. Big 6 refers to the erstwhile Big 6 audit firms and their predecessor and successor firms.*

	Continuing listings†						Initial listings‡		
Year	Continuing Big 6§	New Big 6#	Departing Big 6**	Continuing non–Big 6§	Subtotal	Big 6 share	Big 6	non–Big 6	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period 1 (1975–84)	35,400	759	408	12,665	49,232	73.45%	2,287	1,137	52,656
Period 2 (1985–89)	19,469	535	248	4,877	25,129	79.61%	1,804	691	27,624
Period 3 (1990–94)	21,457	335	325	4,264	26,381	82.60%	2,566	602	29,549
Period 4 (1995–99)	24,647	360	451	4,770	30,228	82.73%	2,559	541	33,328
Total	100,973	1,989	1,432	26,576	130,970	78.61%	9,216	2,971	143,157

(The table is continued on the next page.)

TABLE 2 (Continued)

Notes:

* From 1975 to 1988, Big 6 includes clients of the Big 8 firms: Arthur Andersen, Arthur Young, Coopers & Lybrand, Deloitte Haskins & Sells, Ernst & Whinney, Peat Marwick Mitchell/KPMG Peat Marwick, Price Waterhouse, and Touche Ross. For the period 1989 to 1997, Big 6 includes clients of Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse. For the period 1997–99, Big 6 includes clients of the Big 5 audit firms Arthur Andersen, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and PricewaterhouseCoopers.

† Continuing listings are clients listed on COMPUSTAT for at least one year prior to the year listed in Column 1.

‡ Initial listings are clients first listed on COMPUSTAT in the year shown in Column 1.

§ Continuing Big 6 (non–Big 6) clients are clients that retained a Big 6 (non–Big 6) auditor in the year shown in column 1 and any Big 6 (non–Big 6) auditor in the immediately preceding year.

New Big 6 clients are clients that retained a Big 6 auditor in the year shown in column 1 and a non–Big 6 auditor in the immediately preceding year.

** Departing Big 6 clients are clients that retained a non–Big 6 auditor in the year shown in column 1 and a Big 6 auditor in the immediately preceding year.

5. Results

We report results obtained from a (robust) ordinary least squares (OLS) regression analysis of changes in average client riskiness, followed by the results of the decile regression analysis and, finally, the results from the analysis of client shares in risky industries and in the most-risky client categories are reported.

Changes in average client riskiness across time periods

We rely mainly on the evidence from the interperiod differences in summary measures — that is, *Z*, *ZS*, and *ZMJ* (reported in columns 2 through 4 of Table 4) to classify the overall direction of changes in client riskiness. The summary measures are useful overall indicators of financial condition because they subsume a number of key aspects of client financial riskiness such as liquidity, profitability, activity, and solvency. The results for tests of differences over time in eight additional ratios (*CR*, *QR*, *NPM*, *EBITA*, *RTA*, *STA*, *CFTL*, *TLTA*) are used mainly to examine whether the changes in the summary measures are due to changes in specific components of financial riskiness.

When interperiod differences in all three summary measures indicate a significant shift in risk in a consistent direction (for example, *Z* and *ZS* increasing, *ZMJ* decreasing), we interpret the results as definite or strong evidence of a shift in client riskiness in that direction. When two out of three differences are significant in one direction (and the third is not significant), we interpret the results as moderate

TABLE 3
Summary statistics for variable distributions

Measures of central tendency and dispersion for client financial characteristics described in Table 1 for the sample described in Table 2.

Measure*		Statistic	Period			
			Pre-1985†	1985–89	1990–94	1994–99
Summary measures	*Z* (+)	mean	5.64	4.85	3.33	3.28
		median	3.38	2.93	2.97	2.83
		s.d.	65.30	39.95	166.65	103.35
	ZS (+)	mean	(0.95)	4.10	(17.17)	(39.87)
		median	4.54	3.72	3.69	3.28
		s.d.	793.75	297.68	2770.65	3273.64
	ZMJ (–)	mean	(1.38)	(0.27)	(0.47)	0.32
		median	(1.78)	(1.43)	(1.45)	(1.38)
		s.d.	9.23	53.11	22.48	38.02
Liquidity	*CR* (+)	mean	3.05	3.19	3.12	2.89
		median	1.96	1.82	1.79	1.80
		s.d.	19.14	12.00	15.35	5.85
	QR (+)	mean	2.11	2.39	2.37	2.19
		median	1.09	1.07	1.06	1.10
		s.d.	18.11	11.83	15.30	5.70
Profitability	*NPM* (+)	mean	35.30	68.15	73.36	69.39
		median	0.04	0.03	0.02	0.02
		s.d.	597.01	829.23	869.84	852.69
	EBITA (+)	mean	0.08	(0.02)	(0.04)	(0.14)
		median	0.11	0.08	0.07	0.06
		s.d.	0.54	1.04	2.00	3.45
Activity	*RTA* (+)	mean	0.21	0.19	0.19	0.18
		median	0.19	0.17	0.17	0.15
		s.d.	0.15	0.14	0.15	0.15
	STA (+)	mean	1.42	1.27	1.32	1.22
		median	1.29	1.10	1.13	1.01
		s.d.	1.12	1.18	2.39	2.34
Solvency	*CFTL* (+)	mean	0.23	0.04	(0.03)	(0.12)
		median	0.16	0.13	0.13	0.12
		s.d.	9.92	10.31	2.56	4.07
	TLTA (–)	mean	0.59	0.70	0.65	0.70
		median	0.54	0.56	0.54	0.53
		s.d.	1.48	8.71	3.15	4.74

(The table is continued on the next page.)

TABLE 3 (Continued)

Measure*		Statistic	Period			
			Pre-1985†	1985–89	1990–94	1994–99
Other	*CA*	mean	197.53	296.47	358.59	452.16
		median	16.51	21.46	27.52	40.03
		s.d.	965.84	1,478.54	1,988.97	2,243.71
	CL	mean	134.71	216.13	276.14	353.79
		median	8.22	10.58	13.35	18.62
		s.d.	784.60	1128.84	1,595.46	1,888.24
Free cash flow	*FCF*	mean	(17.07)	13.34	36.06	34.49
		median	0.92	1.06	2.08	2.31
		s.d.	776.84	647.29	656.32	943.60
Size	*TA*	mean	518.73	861.79	1,041.28	1,355.92
		median	32.86	42.52	54.89	83.53
		s.d.	2,739.76	3,916.31	5,073.27	6,061.03
	SALE	mean	567.40	830.78	989.89	1,220.37
		median	38.86	48.80	63.96	83.53
		s.d.	2,949.85	4,121.40	5,058.16	5,760.07
Owners' equity	*RE*	mean	139.35	198.97	210.79	255.98
		median	6.09	3.67	2.46	1.34
		s.d.	806.33	1,253.84	1,450.06	1,906.68
	MVEQ	mean	286.62	508.01	809.29	1,390.10
		median	25.78	37.74	54.84	93.91
		s.d.	1,451.22	2,285.58	3,421.49	6,843.93

Notes:

* The sign (in parentheses) after each measure is the direction in which the measure would move as portfolio riskiness *decreases* — that is, as clients become *less* risky. Variables for which we have no directional prediction (control variables) are left unsigned.

† The pre-1985 (benchmark) period covers the years 1975–84.

evidence of a change in client riskiness in that direction. If only one difference is significant, we interpret the results as weak evidence of a change in client riskiness in that direction. If all three are not significant, or if the differences are significant but inconsistent in direction across summary measures, we interpret the results as inconclusive — that is, as indicating no overall change in client riskiness.

Table 4 reports statistically significant differences in coefficients for different client-type-and-time-period combinations.[20] Each column of Table 4 reports differences in coefficients estimated from a single regression in which the dependent variable is shown at the head of the column, together with the expected sign of the difference if client riskiness were to increase over time.[21] The client subgroups being compared are shown in the left-most column. Only differences significant at

TABLE 4
Interperiod intragroup comparisons of client characteristics

Tests for differences in coefficients estimated from robust ordinary least squares (OLS) regressions of client financial characteristics on indicator variables using the model:

$$y_{ijt} = b_0 + b_{C2}C2 + b_{C3}C3 + b_{C4}C4 + b_{N1}N1 + b_{N2}N2 + b_{N3}N3 + b_{N4}N4 + b_{D1}D1 + b_{D2}D2 + b_{D3}D3 + b_{D4}D4 + b_{O1}O1 + b_{O2}O2 + b_{O3}O3 + b_{O4}O4 + b_{CLEAN}CLEAN + b_{REG}REG + b_{LITIG}LITIG + b_{HITEC}HITEC + b_{TA}TA_{jt} + \epsilon_{ijt}$$

Each cell reports the differences (significant at 1 percent) in coefficients for the comparisons shown in column 1.

	Summary			Liquidity		Profitability		Activity		Solvency		Other		
	Z	*ZA*	*ZMJ*	*CR*	*QR*	*NPM*	*EBITA*	*RTA*	*STA*	*CFTL*	*TLTA*	*CA*	*CL*	*FCF*
Tests	+	+	−	+	+	+	+	+	+	+	−			
C1-C2	0.34	0.51	(0.27)	0.11	0.02	0.01	0.03	0.02	0.11	0.02	~	0.30	0.30	0.39
C2-C3	(0.26)	(0.22)	0.22	(0.07)	(0.06)	~	~	0.00	(0.04)	(0.03)	0.04	0.30	0.21	(0.72)
C3-C4	0.25	0.45	(0.21)	0.10	0.04	(0.00)	0.01	0.02	0.13	0.03	(0.02)	(0.76)	0.24	0.59
N1-N2	0.60	0.66	(0.43)	0.10	~	0.01	0.02	0.01	0.05	0.03	(0.03)	~	~	~
N2-N3	~	~	~	~	~	(0.01)	(0.02)	~	(0.13)	(0.04)	~	~	(0.75)	~
N3-N4	0.66	0.56	(0.40)	0.09	~	0.01	0.04	0.02	0.24	0.06	0.03	~	~	1.72
D1-D2	0.94	1.07	(0.44)	0.14	~	0.01	0.02	~	~	0.05	~	~	~	~
D2-D3	~	~	~	~	~	0.01	0.01	~	(0.09)	~	~	~	~	~
D3-D4	0.54	0.73	~	~	~	0.01	0.02	~	0.10	0.05	~	~	~	0.89

(The table is continued on the next page.)

TABLE 4 (Continued)

Notes:

The sign (+/−) shown under each variable is the expected sign of the comparison shown in column 1 under the alternative hypothesis that the left-hand side (LHS) in each comparison is less risky than the right-hand side (RHS). ~ indicates that the difference in coefficients compared was not significant at 1 percent.

Variables used in the regression are:

y_{ijt} = ith financial characteristic for client j in period t. See Table 1 for the set of financial characteristics. Indicator variables for client type and time period interactions are defined as follows:

Period 1	= pre-1985, period 2 = 1985–89, period 3 = 1990–94, and period 4 = post-1994.
C2, *C3*, *C4*	= 1 when the client is a continuing Big 6 client (Table 2, column 2) in periods 2 through 4 respectively, 0 otherwise. (The model treats *C1* as the "base" case.)
N1, *N2*, *N3*, *N4*	= 1 when the client is a new Big 6 client (Table 2, column 3) or an initially listed Big 6 client (Table 2, column 8) in periods 1 through 4 respectively, 0 otherwise.
D1, *D2*, *D3*, *D4*	= 1 when the client is a departing Big 6 client (Table 2, column 4) or an initially listed non–Big 6 client (Table 2, column 9) in periods 1 through 4 respectively, 0 otherwise.
O1, *O2*, *O3*, *O4*	= 1 when the client is a continuing non–Big 6 ("other" firm) client (Table 2, column 5) in periods 1 through 4 respectively, 0 otherwise.
CLEAN	= 1 when the auditor issues a clean opinion, 0 otherwise.
REG	= 1 if the firm is in a regulated industry as defined in Hogan and Jeter 1999, 0 otherwise.
LITIG	= 1 if the firm is in a litigious industry as defined in Hogan and Jeter 1999, 0 otherwise.
HITEC	= 1 if the firm is in a high-technology industry as defined in Kasznik and Lev 1995, 0 otherwise.
TA_{jt}	= total assets of the jth client in year t.
ϵ_{ijt}	= error term.

1 percent or smaller are shown in the table.[22] All other differences (that is, those not significant at 1 percent or smaller) are indicated by "~".

The first row of Table 4 (labeled *C1-C2*) shows that each of the *Z*, *ZS*, and *ZMJ* comparisons are consistent with the expected sign under the hypothesis that period 2 continuing clients (*C2*) are riskier than period 1 continuing clients (C1). We interpret this as definite evidence of a deterioration in continuing client riskiness during the period of increasing Big 6 concerns about litigation pressure

(1985–89). The next row (*C2-C3*) shows an improvement (that is, reduction) in client financial riskiness in the period of mixed incentives (1990–94), while the *C3-C4* comparison shows that client financial riskiness deteriorated (increased) in the post-reform period (post-1994). Similarly, unadjusted comparisons for both new and departing clients show definite evidence of risk deterioration from period 1 (pre-1985) to period 2 (1985–89), no change from period 2 to period 3 (1990–94), and definite evidence of risk deterioration from period 3 to period 4 (post-1994). The results for the eight additional ratios show that the interperiod variation in these ratios is broadly consistent (that is, for the most part either directionally consistent and significant, or not significant) with those in the summary measures. This suggests that the conclusions drawn from the summary measures are not likely driven by changes in just one component of client financial risk.

The evidence in Table 4 of an increase in client financial riskiness during the 1985–89 period of increasing litigation pressure is inconsistent with our hypothesis that during periods of increasing concern about liability exposure Big 6 client portfolios would become less risky. The evidence of decreases in client riskiness during the 1990–94 period of mixed incentives and of increases in client riskiness during the post-1994 post-reform period is consistent with expectations. Figure 2, panel A provides a schematic summary of these conclusions for comparison with the conclusions from other tests to be reported below.

Table 5 reports results obtained by replicating the procedures used to generate Table 4 on industry-adjusted values of the risk measures. Because the Big 6 collectively audit the overwhelming majority of the firms in our sample, it could be argued that collectively they cannot also avoid exposure to the natural variation in riskiness caused by macroeconomic conditions. Consequently their risk-management efforts are best measured by examining where their clients are located within the distribution of all clients. The industry standardization procedure allows us to draw such a picture.

The industry adjustment was implemented by standardizing the value of the risk measure for each client by subtracting the (two-digit Standard Industrial Classification [SIC] code) client-industry mean of the risk measure and dividing the result by the industry standard deviation of the risk measure. The resulting standardized measure has the flavor of a normalized deviation from the industry mean for that year. Comparing standardized risk measures across different client-type-and-time-period combinations should abstract from the effects of year-to-year shifts in the distribution of (the raw values of) each risk measure within each industry.

The first three rows of Table 5 show definite evidence of a risk improvement for continuing clients during both 1985–89 and 1990–94 and moderate evidence of a deterioration in post-1994 (post-reform) riskiness. The next three rows show moderate evidence of an improvement in new client riskiness during 1990–94 and weak evidence of deterioration in their post-1994 riskiness. There is no evidence of any change in the riskiness of departing clients during the entire period of study in the last three rows of Table 5. Overall, the evidence from the industry-adjusted risk measures suggests that Big 6 firms' clienteles became less risky in 1985–89 and

Figure 2 Summary of principal inferences from the results reported in Tables 4 to 7

	Time period		
	Period 2 1985–89	Period 3 1990–94	Period 4 1995–99
Litigation environment	Increasing concern	Period of reliefs	Post-reliefs
Panel A: Summary of Table 4 (robust regressions using unadjusted risk measures) inferences			
Continuing	definite deterioration	definite improvement	definite deterioriation
New	definite deterioration	~	definite deterioriation
Departing	definite deterioration	~	moderate deterioration
Panel B: Summary of Table 5 (robust regressions using industry-adjusted risk measures) inferences			
Continuing	definite improvement	definite improvement	moderate deterioration
New	~	moderate improvement	weak deterioriation
Departing	~	~	~
Panel C: Summary of Table 6 (risky decile regressions using unadjusted risk measures) inferences			
Continuing	definite deterioration	weak improvement	definite deterioriation
New	definite deterioration	~	definite deterioriation
Departing	definite deterioration	moderate deterioration	definite deterioriation
Panel D: Summary of Table 7 (risky decile regressions using industry-adjusted risk measures) inferences			
Continuing	moderate improvement	moderate improvement	weak improvement
New	weak improvement	moderate improvement	weak deterioriation
Departing	weak deterioriation	~	moderate deterioration

Notes:

Deterioration = increase in client riskiness; improvement = decrease in client riskiness (compared with the previous period).

Risk changes reported in the tables are summarized in this figure as follows:

Definite evidence = all three summary measures (*Z*, *ZS*, and *ZMJ*) indicate a statistically significant (at 1 percent) change in one direction (improvement or deterioration).

Moderate evidence = two out of three summary measures (*Z*, *ZS*, and *ZMJ*) indicate a statistically significant (at 1 percent) change in one direction (improvement or deterioration) and the other is not statistically significant.

Weak evidence = one of three summary measures (*Z*, *ZS*, and *ZMJ*) indicates a statistically significant (at 1 percent) change in one direction (improvement or deterioration) and the other two measures are not statistically significant.

~ = either none of the three summary measures (*Z*, *ZS*, and *ZMJ*) shows a significant change or the pattern of changes is inconsistent in the sense that it cannot be classified using the categories defined above.

TABLE 5
Industry-adjusted interperiod intragroup comparisons of client characteristics

Tests for differences in coefficients estimated from robust OLS regressions of client financial characteristics on indicator variables using the model:

$$y_{ij} = b_0 + b_{C2}C2 + b_{C3}C3 + b_{C4}C4 + b_{N1}N1 + b_{N2}N2 + b_{N3}N3 + b_{N4}N4 + b_{D1}D1 + b_{D2}D2 + b_{D3}D3 + b_{D4}D4 + b_{O1}O1 + b_{O2}O2 + b_{O3}O3 + b_{O4}O4 + b_{CLEAN}CLEAN + b_{REG}REG + b_{LITIG}LITIG + b_{HITEC}HITEC + b_{TA}TA_{jt} + \epsilon_{ijt}$$

Each cell reports the differences (significant at 1 percent) in coefficients for the comparisons shown in column 1.

	Summary			Liquidity		Profitability		Activity		Solvency		Other		
	Z	*ZA*	*ZMJ*	*CR*	*QR*	*NPM*	*EBITA*	*RTA*	*STA*	*CFTL*	*TLTA*	*CA*	*CL*	*FCF*
Tests	+	+	−	+	+	+	+	+	+	+	−			
C1-C2	(0.09)	(0.11)	0.08	~	~	(0.04)	(0.10)	~	~	(0.14)	0.07	0.02	0.02	(0.04)
C2-C3	(0.05)	(0.06)	0.05	(0.05)	(0.04)	0.02	(0.02)	~	~	(0.04)	0.06	(0.02)	(0.01)	0.03
C3-C4	~	0.05	(0.06)	0.04	0.03	0.02	0.04	~	0.02	0.05	(0.06)	~	~	(0.01)
N1-N2	~	~	~	~	~	~	(0.11)	~	~	(0.11)	~	~	~	(0.09)
N2-N3	(0.17)	(0.13)	~	~	~	~	~	(0.13)	(0.12)	~	~	~	~	0.07
N3-N4	~	~	(0.06)	~	~	0.06	0.18	0.14	0.18	0.08	0.05	(0.05)	(0.04)	~
D1-D2	~	~	~	~	~	~	(0.10)	~	~	(0.14)	~	~	~	(0.09)
D2-D3	~	~	~	~	~	~	~	~	(0.11)	~	~	~	~	~
D3-D4	~	~	~	~	~	~	0.09	~	~	~	~	(0.04)	(0.04)	~

(The table is continued on the next page.)

TABLE 5 (Continued)

Notes:

The sign (+/−) shown under each variable is the expected sign of the comparison shown in column 1 under the alternative hypothesis that the LHS in each comparison is less risky than the RHS. ~ indicates that the difference in coefficients compared was not significant at 1 percent.

Industry adjustments were implemented by subtracting the corresponding industry (defined as 4-digit SIC code) mean from each observation and dividing by the corresponding industry standard deviation.

Variables are as defined in Table 4.

1990−94 and then became riskier again in the post-1994, post-reform period. Broadly speaking, these results are consistent with the hypothesized changes set out in Figure 1. Figure 2, panel B provides a schematic summary of these conclusions for comparison with the conclusions from other tests reported in the paper.

Collectively, the evidence from both Tables 4 and 5 suggests that Big 6 clienteles underwent a definite risk improvement in 1990−94 and a definite to moderate risk deterioration in the post-1994, post-reform period. However, the evidence for the 1985−89 period is mixed. If one believes that the raw risk metrics are the correct measure to gauge shifts in client portfolio riskiness, then the results in Table 4 could be used to argue that Big 6 clienteles underwent a definite risk deterioration at a time when concerns about professional liability were said to be mounting. However, it can be argued that, given their market dominance, the Big 6 audit firms cannot avoid significant exposure to economy-wide fluctuations in client riskiness. Therefore an industry-standardized risk metric may well be the better measure of changes in client portfolio riskiness. Seen in this light, the evidence from Table 5 suggests that Big 6 clienteles became less risky during the time of mounting concern.[23] In other words, the discrepancy between the unadjusted and industry-adjusted results for 1985−89 suggests that changes in the industry composition of Big 6 clienteles may be a materially significant driver of changes in client financial riskiness. We investigate this issue further after the following discussion of the results from the decile regression analysis.

Changes in riskiest decile cutoffs across time periods

Table 6 reports the results of interperiod differences in the riskiest decile cutoffs for each risk measure.[24] The procedures used to generate the results reported in Table 6 are identical to those used in Table 4, and the interpretation of the results reported in Table 6 follows that of Table 4. Table 6 differs from Table 4 only in that whereas Table 4 reports differences in subgroup means, Table 6 reports differences in the 10th percentile of each of the risk measures that increases in client riskiness, for example, the Altman *Z*-score, and the 90th percentile of each of the risk measures that decrease in client riskiness, for example, the Zmijewski *ZMJ* score.

TABLE 6
Interperiod intragroup comparisons of most risky client deciles

Tests for differences in coefficients from percentile regressions of client financial characteristics on indicator variables using the model:

$$y_{ijt} = b_0 + b_{C2}C2 + b_{C3}C3 + b_{C4}C4 + b_{N1}N1 + b_{N2}N2 + b_{N3}N3 + b_{N4}N4 + b_{D1}D1 + b_{D2}D2 + b_{D3}D3 + b_{D4}D4 + b_{O1}O1 + b_{O2}O2 + b_{O3}O3 + b_{O4}O4 + b_{CLEAN}CLEAN + b_{REG}REG + b_{LITIG}LITIG + b_{HITEC}HITEC + b_{TA}TA_{jt} + \epsilon_{ijt}$$

Each cell reports the differences (significant at 1 percent) in coefficients for the comparisons shown in column 1.

	Summary			Liquidity		Profitability		Activity		Solvency		Other		
	Z	*ZA*	*ZMJ*	*CR*	*QR*	*NPM*	*EBITA*	*RTA*	*STA*	*CFTL*	*TLTA*	*CA*	*CL*	*FCF*
Tests	+	+	−	+	+	+	+	+	+	+	−			
C1-C2	0.51	0.60	(0.60)	0.11	0.05	0.06	0.08	0.01	~	0.07	(0.04)	~	0.32	(2.16)
C2-C3	~	~	0.16	~	(0.03)	~	~	0.01	~	0.02	0.03	(0.84)	~	(2.36)
C3-C4	0.45	0.51	(0.58)	0.09	0.03	0.20	0.08	0.01	0.11	0.17	(0.05)	(0.63)	0.92	23.80
N1-N2	1.77	2.35	(1.17)	0.12	0.05	0.37	0.20	0.01	~	0.43	(0.10)	~	~	~
N2-N3	(1.17)	(1.88)	(0.32)	~	~	(0.35)	(0.06)	~	~	(0.15)	(0.05)	~	~	~
N3-N4	2.08	2.21	(3.09)	0.17	~	2.62	0.51	0.01	0.15	1.22	(0.16)	~	~	6.88
D1-D2	3.69	6.18	(2.93)	0.12	~	0.18	0.37	~	~	0.66	(0.13)	~	~	~
D2-D3	0.88	~	(0.69)	~	~	(0.64)	~	~	~	(0.13)	(0.16)	~	~	~
D3-D4	11.45	11.48	(5.75)	~	~	1.13	0.60	~	~	0.51	(0.36)	~	~	4.40

Notes:

The sign (+/−) shown under each variable is the expected sign of the comparison shown in column 1 under the alternative hypothesis that the LHS in each comparison is less risky than the RHS. ~ indicates that the difference in coefficients compared was not significant at 1 percent.

Variables are as defined in Table 4.

Table 6 yields results very close to those reported in Table 4, with two notable differences. First, continuing clients in period 3 show weak evidence of risk improvement relative to period 2 (in contrast to Table 4, which shows definite evidence of improvement). Second, Table 6 shows moderate evidence of deterioration in the riskiness of departing clients from period 2 to period 3 (whereas the corresponding results in Table 4 are inconclusive).[25] Other than these differences, the results in Table 6 confirm the basic tenor of those in Table 4: there is a general improvement in the riskiness of Big 6 clienteles during 1985–89 and a deterioration in their riskiness during the post-1994 period. Figure 2, panel C provides a schematic summary of these conclusions for comparison with the conclusions from other tests reported in the paper.

Table 7 replicates the results of Table 6 using industry-standardized data. The general pattern of results in Table 7 is quite similar to that in Table 5. There are no reversals of direction, and in general the differences between Tables 5 and 7 are to be found in the degree of significance of the differences. The only exception is that in the case of continuing clients in period 4, the industry-adjusted risky decile regressions of Table 7 show a moderate improvement in riskiness while the corresponding mean regressions of Table 5 show a moderate deterioration. Thus, the reforms in period 3 appear to have allowed the Big 6 firms to relax the average quality of their continuing clients, but on the whole the evidence suggests that they are still avoiding very risky clients. Figure 2, panel D provides a schematic summary of these conclusions for comparison with the conclusions from other tests reported in the paper.

Figure 2, which summarizes the principal thrust of the findings of Tables 4 through 7, suggests three principal conclusions. First, during 1985–89 (period 2), Big 6 clienteles seem to exhibit deterioration in riskiness as measured by raw risk measures, but improvements in riskiness as measured by industry-standardized risk measures. This difference is consistent with Big 6 firms pursuing relatively safer clients in (relatively more) risky industries so that the distribution of raw measures of their clients' financial riskiness indicates a deterioration while the industry-adjusted measures of client riskiness indicate an improvement in client riskiness during 1985–89. Second, irrespective of how financial riskiness is measured (raw or industry-adjusted), Big 6 clienteles appear to have become less risky during 1990–94 (period 3). Third (and again, irrespective of how financial riskiness is measured, raw or industry-adjusted), Big 6 clienteles appear to have become more risky during 1995–99 (period 4). The second and third findings are consistent with Big 6 firms reducing the riskiness of their clienteles during a period in which they were lobbying for liability reliefs and increasing the riskiness of their clients once they obtained such relief.

Changes across time periods in market shares in litigious industries and risky client categories

Table 8 reports, by period, the number of continuing, new, and departing Big 6 clients in each of the seven litigious industries identified in prior research (e.g., Bohn and Choi 1996; Hogan and Jeter 1999). The penultimate row of Table 8 reports the

TABLE 7
Industry-adjusted interperiod intragroup comparisons of most risky client deciles

Tests for differences in coefficients from percentile regressions of client financial characteristics on indicator variables using the model:

$$y_{ijt} = b_0 + b_{C2}C2 + b_{C3}C3 + b_{C4}C4 + b_{N1}N1 + b_{N2}N2 + b_{N3}N3 + b_{N4}N4 + b_{D1}D1 + b_{D2}D2 + b_{D3}D3 + b_{D4}D4 + b_{O1}O1 + b_{O2}O2 + b_{O3}O3 + b_{O4}O4 + b_{CLEAN}CLEAN + b_{REG}REG + b_{LITIG}LITIG + b_{HITEC}HITEC + b_{TA}TA_{jt} + \epsilon_{ijt}$$

Each cell reports the differences (significant at 1 percent) in coefficients for the comparisons shown in column 1.

	Summary			Liquidity		Profitability		Activity		Solvency		Other		
	Z	*ZA*	*ZMJ*	*CR*	*QR*	*NPM*	*EBITA*	*RTA*	*STA*	*CFTL*	*TLTA*	*CA*	*CL*	*FCF*
Tests	+	+	−	+	+	+	+	+	+	+	−			
C1-C2	(0.13)	(0.19)	~	(0.10)	(0.10)	(0.13)	(0.11)	(0.04)	~	(0.06)	~	0.02	~	0.02
C2-C3	(0.09)	(0.14)	~	(0.05)	(0.06)	(0.06)	(0.17)	(0.04)	(0.05)	(0.07)	~	(0.02)	(0.02)	(0.07)
C3-C4	~	~	0.10	0.05	0.05	~	0.10	0.05	0.03	0.09	(0.07)	(0.02)	(0.02)	~
N1-N2	~	~	0.16	(0.11)	(0.08)	(0.41)	(0.18)	~	(0.09)	~	(0.12)	~	~	(0.10)
N2-N3	(0.22)	(0.30)	~	~	~	(0.19)	~	(0.11)	~	(0.18)	(0.13)	~	~	~
N3-N4	~	0.47	~	~	~	0.08	0.37	0.14	0.13	0.45	~	(0.05)	(0.05)	~
D1-D2	~	0.42	~	(0.14)	(0.12)	(0.38)	~	~	~	~	~	~	~	(0.12)
D2-D3	~	~	~	~	~	(0.19)	~	~	~	~	~	~	~	~
D3-D4	0.56	0.47	~	~	~	~	0.30	~	~	0.21	~	(0.07)	~	~

(The table is continued on the next page.)

TABLE 7 (Continued)

Notes:

The sign (+/−) shown under each variable is the expected sign of the comparison shown in column 1 under the alternative hypothesis that the LHS in each comparison is less risky than the RHS. ~ indicates that the difference in coefficients compared was not significant at 1 percent.

Industry adjustments were implemented by subtracting the corresponding industry (defined as 4-digit SIC code) mean from each observation and dividing by the corresponding industry standard deviation.

Variables are as defined in Table 4.

proportion of litigious-industry clients in the entire sample while the last row of Table 8 reports the proportion of such clients in the overall Big 6 portfolio. In every period, the two proportions are about the same. In other words, Big 6 firms do not appear to audit a disproportionately large (or small) fraction of clients in litigious industries in any period.

Table 9 reports several analyses of the subset of high-risk clients — that is, clients for which at least one of the three summary measures (*Z*, *ZS*, or *ZMJ*) is in the riskiest decile of that measure for that year. Panels A and B of Table 9 report the fraction of continuing Big 6, new Big 6, departing Big 6, and continuing non−Big 6 clients classified as high risk using raw and industry-adjusted summary measures of financial risk.[26] Panels C and D of Table 9 report the fraction of high-risk clients classified as continuing Big 6, new Big 6, departing Big 6, and continuing non−Big 6 using raw and industry-adjusted summary risk scores.[27] Finally, panel E summarizes the trends in Big 6 shares of the high-risk submarket using both unadjusted and industry-adjusted summary risk scores. Throughout Table 9, asterisks indicate that the proportion in a period is statistically significantly different from the previous period.

Panels A and B of Table 9 are broadly consistent with a drop (or no change) in the proportion of high-risk continuing and new Big 6 clients during 1985−89 and 1990−94 and a significant increase in the proportion of new high-risk clients in the post-relief period (1995−99). This suggests that Big 6 firms were quite cautious about retaining or adding high-risk clients during the 1985−90 and 1990−94 periods but were more relaxed about adding such clients after 1994. The proportion of high-risk departing clients in both panels A and B, on the other hand, shows a steady increase during 1985−89, 1990−94, and 1995−99. This suggests that, over time, Big 6 firms are more likely to drop high-risk clients (retain clients who are not high risk). In sum, both the unadjusted and industry-adjusted results in panels A and B of Table 9 appear to support the conclusion that throughout 1985−94, the Big 6 became more cautious in accepting risky new clients and in retaining highly risky clients. After 1994, they appear to have become more aggressive in pursuing new high-risk clients while continuing to drop existing high-risk clients (or retain clients that are not high risk).

TABLE 8
Continuing, new, and departing Big 6 clients in litigious industries

Continuing Big 6 clients are those in Table 2, column 2; new Big 6 are those in Table 2, columns 3 and 8; and departing Big 6 clients are those in Table 2, columns 4 and 9 (see related discussion in section 3). The classification of litigious industries follows Hogan and Jeter 1999.

		Continuing Big 6				New Big 6				Departing Big 6			
		Period				Period				Period			
Client industry (2-digit SIC code)		1	2	3	4	1	2	3	4	1	2	3	4
Chemicals and allied products	(28)	1,592	1,155	1,611	1,925	120	161	211	220	58	48	44	49
Industrial and commercial machinery and computer equipment	(35)	2,668	1,573	1,587	1,646	252	170	196	158	96	41	60	71
Electronic and other electrical equipment and components except computer equipment	(36)	2,484	1,546	1,694	2,021	201	164	206	209	100	52	68	62
Measuring, analyzing, and controlling instruments	(38)	1,730	1,285	1,468	1,525	193	159	170	181	103	41	75	63
Depositary institutions	(60)	24	19	22	15	6	3	1	4	2	3	3	2
Holding and other investment offices	(67)	1,006	205	189	191	73	40	29	27	72	29	17	16
Business services	(73)	1,588	1,335	1,632	2,891	229	210	356	703	112	91	94	197
Number of continuing/new/departing litigious industry clients	(A)	11,092	7,118	8,203	10,214	1,074	907	1,169	1,502	543	305	361	460
Number of continuing/new/departing clients in the sample	(B)	35,400	19,469	21,457	24,647	3,046	2,339	2,901	2,919	1545	939	927	992

(The table is continued on the next page.)

TABLE 8 (Continued)

	Continuing Big 6				New Big 6				Departing Big 6			
	Period				Period				Period			
Client industry (2-digit SIC code)	1	2	3	4	1	2	3	4	1	2	3	4
Proportion of litigious industry clients within client type (A ÷ B)	31%	37%	38%	41%	35%	39%	40%	51%	35%	32%	39%	46%
Number of litigious industry clients in sample (C)	16,551	10,104	11,362	14,241								
Proportion of litigious industry clients in sample (C ÷ Col 10, Table 2)	31%	37%	38%	43%								
Proportion of litigious industry clients in overall Big 6 portfolio*	32%	37%	38%	43%								

Note:

* Total of continuing and new Big 6 clients in litigious industries during the period ÷ Total of all continuing and new Big 6 clients during the period.

Panels C and D of Table 9 show that the Big 6 share (both continuing and new) of the most risky clients continued to increase throughout 1985–89 and 1990–94 and dropped a bit in 1995–99 whereas the Big 6 share of risky departing clients increased steadily over time. In other words, the riskiest clients in the sample seem to depart the Big 6 to hire non–Big 6 auditors. Panel E puts both sets of trends in perspective. Recall that the Big 6 have been growing their overall market shares over time during the period of study. Thus the increase shown in panels C

TABLE 9
Proportions of riskiest clients in various client subgroups

Continuing Big 6 clients are those in Table 2, column 2; new Big 6 are those in Table 2, columns 3 and 8; and departing Big 6 are those in Table 2, columns 4 and 9 (see related discussion in section 3).

Panel A: Proportion of riskiest clients as a fraction of all clients of that type[†]

	Period				
Client type	1975–84	1985–89	1990–94	Post-1994	Total
Continuing Big 6	0.139	0.119*	0.122	0.102*	0.122
New Big 6	0.192	0.174**	0.174	0.231*	0.193
Departing Big 6	0.246	0.303*	0.330	0.402*	0.311
Continuing non–Big 6	0.191	0.210*	0.225**	0.268*	0.214

Panel B: Proportion of riskiest (industry-adjusted) clients as a fraction of all clients of that type[‡]

	Period				
Client type	1975–84	1985–89	1990–94	1995–99	Total
Continuing Big 6	0.147	0.143	0.137**	0.133	0.141
New Big 6	0.163	0.164	0.146**	0.168**	0.160
Departing Big 6	0.196	0.232**	0.273**	0.316**	0.247
Continuing non–Big 6	0.169	0.180***	0.186	0.227*	0.185

Panel C: Audit firm shares of the riskiest clients in the economy, by type of client[†, §]

	Period				
Client type	1975–84	1985–89	1990–94	Post-94	Total
Continuing Big 6	0.593	0.584	0.607**	0.530*	0.580
New Big 6	0.070	0.093*	0.108**	0.124*	0.095
Total Big 6	0.663	0.677***	0.715*	0.654*	0.675
Departing Big 6	0.045	0.065*	0.064	0.077*	0.060
Continuing non–Big 6	0.292	0.258*	0.221*	0.269*	0.266
Total non–Big 6	0.337	0.323	0.285	0.346	0.326

(The table is continued on the next page.)

TABLE 9 (Continued)

Panel D: Audit firm shares of the industry-adjusted riskiest clients in the economy, by type of client‡, §

	Period				
Client type	1975–84	1985–89	1990–94	1995–99	Total
Continuing Big 6	0.639	0.663*	0.676***	0.646*	0.141
New Big 6	0.061	0.083*	0.090	0.085	0.160
Big 6	0.700	0.746*	0.766**	0.731*	0.247
Departing Big 6	0.036	0.047*	0.053***	0.057	0.185
Continuing non–Big 6	0.264	0.208*	0.181*	0.213*	0.153
Non–Big 6	0.300	0.254	0.234	0.269	0.270

Panel E: Comparison of overall and riskiest-client segment market shares of Big 6 auditors, by period†, ‡

Period	Big 6 overall market share [1]	Big 6 share of risky† segment [2]	Ratio of [2]/[1]	Big 6 share of industry-adjusted risky‡ segment [3]	Ratio of [3]/[1]
1975–84	73.0%	66.3%	90.8%	70.0%	95.8%
1985–89	78.9%	67.7%	85.8%*	74.6%	94.5%*
1990–94	82.4%	71.4%	86.7%	76.6%	92.9%*
1995–99	82.7%	65.4%	79.1%*	73.1%	88.4%*

Notes:

* = different from fraction in previous period at 1 percent level of significance.

** = different from fraction in previous period at 5 percent level of significance.

*** = different from fraction in previous period at 10 percent level of significance.

† Riskiest clients = clients with unadjusted *Z*, *ZS*, or *ZMJ* scores in the most distressed decile in each year.

‡ Riskiest clients = clients with industry-adjusted *Z*, *ZS*, or *ZMJ* scores in the most distressed decile in each year.

§ Each cell is expressed as a percentage of all observations in the column — that is, each column total is 100 percent.

and D must be viewed against the backdrop of the overall change in their aggregate market share in the sample. Columns 4 and 6 of panel E show that when one compares the trend in Big 6 market shares among high-risk clients against the overall trend in Big 6 shares over time, the Big 6 share of the riskiest clients as a proportion of their share of the entire sample has dropped unambiguously over time. In other words, the overall changes in riskiness of the Big 6 clientele, and in particular

the post-1994 increase in the riskiness of the Big 6 clientele, do not appear to have been driven by "bottom-fishing" — that is, an increase in the Big 6 share of the most risky clients in the economy. Rather, it appears that if anything, the Big 6 have collectively reduced their share of such clients consistently since the mid-1980s all way to the end of the 1990s.

6. Summary and conclusions

This study provides evidence on the riskiness of Big 6 audit firm clienteles during the period 1975–99. We divide this 25-year period into four distinct subperiods: 1975–84, which serves as a benchmark for the other three; 1985–89, which is a period of increasing concerns about auditors' professional liability exposure; 1990–94, which is a period during which a number of relief measures are enacted and implemented; and 1995–99, the post-relief period. We investigate interperiod changes in the riskiness of continuing, new, and departing Big 6 clients; the proportion of litigious-industry clients in Big 6 practices; and Big 6 shares of the riskiest client segment over this period.

Tests based on raw (industry-unadjusted) financial risk measures indicate an increase in Big 6 client riskiness during 1985–89 while tests based on industry-adjusted risk measures indicate a decrease in Big 6 client riskiness during this period. Both raw and industry-adjusted measures yield consistent evidence of a decrease in riskiness during 1990–94 and an increase in client riskiness during 1995–99. The divergence in raw and industry adjusted results for 1985–89 appears to be due in part to the change in the industry-composition of Big 6 clienteles: the proportion of Big 6 clients in litigious industries increases during 1985–89, remains about the same during 1990–95, and increases again in 1995–99. However, throughout the period of study, the proportion of Big 6 clients in litigious industries as a fraction of all Big 6 clients almost exactly mirrors the proportion of such clients in the entire economy: in other words, Big 6 firms do not appear to audit a disproportionately large fraction of litigious-industry clients. On the other hand, during a period when their market share was growing steadily, the Big 6 shares of the financially riskiest clients drop or remain relatively unchanged. Thus it appears that over time Big 6 firms have become increasingly averse to providing services to the most financially risky clients. Overall, we conclude that the increases in the riskiness of Big 6 portfolios in the post-1994 era do not appear to be driven by a systematic pursuit of particularly risky clients.

Our findings provide a clearer picture of how audit firms managed their client risk during an eventful period in which the level of concerns about auditors' professional liability reached an unprecedented level and ultimately resulted in far-reaching changes in the rules governing the organization of professional practices as well as those governing auditor liability. Our conclusions are robust to alternative definitions of control variables for client size such as sales and market value of owners' equity and to alternative statistical specifications such as the use of median regression instead of robust ordinary least squares. However, a number of interesting questions remain to be explored. The results of this study do not, for instance, address to what extent the changes in client riskiness documented in this

study were the result of choices made by auditors or clients or were due to other factors in the economy. Moreover, this study does not provide evidence on other avenues by which auditors may have coped with increased client riskiness — for example, by increasing fees or performing additional audit procedures. Both of these aspects of auditor behavior deserve greater attention in future research.

Endnotes

1. The most notable of these were the limitation of auditors' liabilities under the Racketeer Influenced and Corrupt Organizations (RICO) Act and under the Securities Acts of 1933 and 1934.
2. We use the term "Big 6" to refer to the erstwhile Big 6 and their predecessor/successor firms.
3. See also the special issue on "The Liability Crisis in the United States and Its Impact on Accounting" in the *Journal of Economics and Management Strategy* (1993, volume 2, number 3).
4. Following prior literature (e.g., Dye 1995), we refer to the permission to adopt the limited liability company (LLC) form as "incorporation".
5. We highlight the "withdrawal from risky engagements" argument because that was central to the audit firms' position paper (Arthur Andersen et al. 1992) and is the main focus of our study. More generally, the firms' lobbying efforts were motivated by an explicit desire to curb "frivolous" lawsuits and possibly also by economic self-interests such as reducing business costs (Kinney 1994; Simunic and Stein 1996).
6. Some observers believe that this decision has led to a significant decline in lawsuits against auditors. See for instance "The SEC's Report to the President and the Congress on the First Year of Practice Under the Private Securities Litigation Reform Act of 1995" (Securities and Exchange Commission [SEC] 1997).
7. A detailed analysis of the provisions of the PSLRA or its impact on auditor litigation is beyond the scope of our study (see Ali and Kallapur 2001; Bajaj, Mazumdar, and Sarin 2002). Our focus is on the general impact of these changes on the overall litigation liability pressure confronting auditors.
8. We varied the cutoffs by one year in each direction with no significant change in any of our results.
9. Auditors also use many nonfinancial measures as well to assess the risk of client business failure. However most of these additional measures are proprietary. Moreover, auditors continue to place a great deal of reliance on traditional financial ratios to measure key aspects of client riskiness (Bell, Bedard, Johnstone, and Smith 2002).
10. The number of potential ratios runs into the hundreds. Gombola and Ketz (1983) show that between seven and nine common factors suffice to summarize the information content of most commonly used ratios. For ease of interpretation we selected ratios that usually load distinctively on factors common to various studies.
11. The earnings-management literature suggests, for instance, that managers can exercise greater control over short-term accruals relative to long-term accruals (e.g., Guenther 1994).
12. Because the dependent variables (financial risk measures) are non-normally distributed, we report results of tests based on robust ordinary least squares regression

estimates. We also replicated the tests using coefficient estimates obtained using median regressions and found virtually identical results in all cases.

13. Quantile regressions are more appropriate (than mean regressions) when the goal is to detect changes in the shapes of distributions (Stuart and Ord 1991, 1084).
14. The distributions of various risk measures could also shift due to economy- or industry-wide shocks. As explained below, we investigate the extent to which such nonstationarity affects our conclusions by estimating the regression model using both raw and industry-adjusted risk measures.
15. As discussed earlier, period 3 is one of changing incentives, so we expect no change or a continued decrease in the riskiness of audit clienteles during this period.
16. The four measures of size (*TA*, *SALES*, *RE*, and *MVEQ*) are highly correlated. We use *TA* as the control for client size in the regression analyses reported in the paper. Replicating the analysis with other measures of size in lieu of *TA* does not change the principal conclusions of the study.
17. COMPUSTAT adds coverage of firms based on a number of criteria beyond SEC registration alone (Standard & Poor's 1999). Additional criteria include, among other things, (a) specific customer request to initiate coverage, (b) whether the firm is in a "hot" industry, and (c) change in listing from a regional exchange to a national exchange (personal communication, Standard & Poor's Client Services, July 31, 2002).
18. Wilcoxon tests (not reported) show that financial characteristics of initial listing clients are similar to those of the new and departing Big 6 client subgroups (and dissimilar to those of continuing Big 6 and continuing non–Big 6 client subgroups). Excluding initial listings from the analysis altogether or classifying initial listings as continuing Big 6 or continuing non–Big 6 clients produced results virtually identical to those reported in the paper. For ease of exposition, we henceforth use the term "departing Big 6 clients" to refer to both departing Big 6 and newly listed non–Big 6 clients.
19. Because the focus of this study is changes in client riskiness over time and the results of the intraperiod intergroup tests are consistent with prior research, we omit details that are available on request.
20. Recall that in the regression framework outlined in section 3, the coefficient on each client-type-and-time-period combination indicator (*C2*, *C3*, *C4*; *N1*, *N2*, *N3*, *N4*; *D1*, *D2*, *D3*, *D4*) is the mean of the dependent variable (some risk measure) for that client-type-and-time-period combination.
21. For example, because a lower *Z*-score indicates higher risk, increases in client riskiness as measured by *Z*-scores would result in a positive difference for *C1-C2*, *C2-C3*, etc. The opposite sign would be expected for the *ZMJ* measure because a higher *ZMJ* score indicates higher risk.
22. Although the coefficients are estimated using robust regressions, even the robust standard errors are quite likely understated due to high serial correlation among the observations. Consequently, we use the more conservative 1 percent cutoff for identifying significant differences.
23. We also conducted tests of intraperiod changes in interperiod differences in the coefficients (that is, we tested hypotheses of the form *C1-N1 = C2-N2*, *C1-D1 = C2-D2*, *N1-D1 = N2-D2*, etc.) but found little systematic variation over time. In other words, if we use the continuing clients of each period as the reference group for all other clients

during that period then "distances from continuing clients" do not appear to change much over time. Results of these tests are omitted for brevity.

24. The results reported in Tables 6 and 7 are based on the Koenker and Basset (1982) estimator for the variance-covariance matrix. We also estimated all models using Gould's (1992, 1997) bootstrap estimator for the variance-covariance matrix. The results are virtually identical to those reported in Tables 6 and 7.
25. As firms become more cautious about retaining extant clients, the cutoffs for retaining clients go up. Consequently the riskiest decile cutoff for departing clients should either stay the same or rise. Similarly, if firms are more cautious about adding new clients, the riskiest decile cutoff for new clients either stays the same or rises. On the other hand, when firms are less cautious (more aggressive) about adding new clients or retaining extant risky clients, the riskiest decile cutoffs for both new and departing clients stay the same or fall.
26. In other words, if there are 100 continuing clients and 14 of them are also classified as high-risk clients then the continuing Big 6 proportion of "continuing risky clients as a fraction of all continuing clients" is 14 percent. The same definition applies mutatis mutandis to new Big 6, departing Big 6, and continuing non–Big 6 client groups as well.
27. Thus if there are 100 high-risk clients in a period and 60 of them are continuing Big 6 clients, 10 are new Big 6, 10 are departing Big 6 and 20 are continuing non–Big 6, the market shares would be: continuing Big 6 — 60 percent, new Big 6 — 10 percent, departing Big 6 — 10 percent, and continuing non–Big 6 — 20 percent in panels C and D. In panel E, the continuing and new client categories would be collapsed into one to yield a Big 6 share of 70 percent.

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