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Litigation Risk and the Financial Reporting Credibility of Big 4 versus Non-Big 4 Audits: Evidence from Anglo-American Countries

Inder K. Khurana
University of Missouri–Columbia

K. K. Raman
University of North Texas

ABSTRACT: Prior research suggests that Big 4 auditors provide higher quality audits in the U.S. in order to protect the firm's brand name reputation and to avoid costly litigation. In this study, we examine whether the perceived higher quality of a Big 4 audit is related to auditor litigation exposure or to reputation concerns. Specifically, we utilize an estimable proxy for financial reporting credibility—the *ex ante* cost of equity capital—to examine whether Big 4 auditors are perceived as providing higher quality audits (relative to non-Big 4 auditors) in the U.S., and in the less litigious (but economically similar) environments in other Anglo-American countries during the 1990–99 period. We find that a Big 4 audit is associated with a lower *ex ante* cost of equity capital for auditees in the U.S. but not in Australia, Canada, or the U.K. Our findings suggest that it is litigation exposure rather than brand name reputation protection that drives perceived audit quality.

Keywords: *financial reporting credibility; Big 4 versus non-Big 4 audits;* ex ante *cost of equity capital; corporate governance.*

Data Availability: *Data are publicly available from sources identified in the paper.*

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I. INTRODUCTION

An independent audit is expected to lend credibility to financial statements (Jensen and Meckling 1976).[1] Prior research (e.g., Raman and Wilson 1994; Teoh and Wong 1993) reports findings from the U.S. audit market that suggests that the four largest international accounting firms (the Big 4) are *perceived* as providing higher quality audits and enhanced assurance on financial statements relative to other (non-Big 4) audit firms.[2] Other research (e.g., DeAngelo 1981; Francis and Krishnan 1999) suggests that Big 4 auditors provide higher quality audits in the U.S. in order to protect the firm's reputation and to avoid costly litigation.

The purpose of our study is to examine whether the perceived higher quality of a Big 4 audit is related to auditor litigation exposure or to reputation concerns.[3] It is important to distinguish between the two explanations (litigation concerns versus reputation protection) for perceived higher audit quality because of their differing implications for regulators. If reputation protection drives audit quality, then a decrease in auditor litigation risk (as part of legal reform) should have no adverse effect on audit quality. By contrast, if litigation concerns drive audit quality, then a decrease in auditors' litigation exposure could have unintended consequences for audit quality.

Agency theory suggests that credible financial reporting reduces the information asymmetry between corporate managers and stockholders, improves investor confidence, raises the stock price, and thereby makes it less costly for corporations to raise new equity capital and grow (Jensen and Meckling 1976). Consistent with prior research (e.g., Datar et al. 1991; Slovin et al. 1990; Titman and Trueman 1986), the enhanced assurance on financial statements provided by a Big 4 audit is expected to translate into a tangible benefit for the client in the form of a lower *ex ante* cost of equity capital. In other words, to the extent that investors perceive the Big 4 as providing a higher quality audits and more credible financial statements, firms audited by the Big 4 (relative to those audited by non-Big 4 auditors) are expected, *ceteris paribus*, to have a lower *ex ante* cost of equity capital. Hence, we utilize the auditee-specific *ex ante* cost of equity capital as a proxy for financial reporting credibility. Further, because litigation exposure can vary across countries, we compare internationally the perceived audit quality of Big 4 and non-Big 4 audits. Specifically, we investigate whether Big 4 auditors are perceived as providing higher quality audits (relative to non-Big 4 auditors) in the U.S. and in the less litigious environments in other Anglo-American countries.

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[1] Financial statements are a principal means of communicating financial information to those outside the corporate entity. Given the information gap (asymmetry) and the potential conflict of interest that exists between corporate insiders and outsider investors, "[t]rustworthy ... audits are essential to the efficient allocation of resources in a capital market environment, where investors are dependent on reliable information" (SEC 2000, 4). Quoting the U.S. Supreme Court, the SEC (2000, 5) notes that "Public faith in the reliability of a corporation's financial statements depends upon the public perception of the outside auditor as an independent professional ..."

[2] Our study examines a time period (1990–99) preceding the recent demise of Arthur Andersen, which reduced the Big 5 to the Big 4. Prior to the mergers during the 1990s, the Big 4 were referred to as the Big 8, the Big 6, and subsequently as the Big 5. For convenience, throughout the paper we refer only to the Big 4.

[3] While audit quality has been much explored in the prior literature, financial reporting credibility in relation to auditor type has been relatively unexplored. "Audit quality" reflects a preparer view of financial statements and focuses on financial statement measures such as material errors or discretionary accruals. By contrast, "financial reporting credibility" reflects a user (investor) view, i.e., are the financial statements more credible with a Big 4 (relative to a non-Big 4) audit, and focuses on investor decision measures such as the earnings response coefficient (ERC) or the cost of capital. As noted by Levitt (2000), investor perceptions of audit quality play a critical role in maintaining systemic confidence in the integrity of financial reporting. The higher the perceived audit quality, the more credible the auditee's financial statements.

We include other Anglo-American countries in our study because their economies are fairly close to that of the U.S. (such that the economic role of the auditor is similar to that in the U.S. and concerns about damage to reputation are valid). At the same time, these countries are far less litigious relative to the U.S. (Baginski et al. 2002; Seetharaman et al. 2002; Wingate 1997). Stated differently, we expect the many similarities in the institutional environments of these countries and the U.S. to strengthen the internal validity of our analysis. Thus, we utilize the U.S. as a benchmark, and examine these other countries, which are less litigious, to isolate the effect of reputation protection. To neutralize the potential confounding effects of other cross-border differences (if any) among these countries, we investigate the relative credibility of Big 4 and non-Big 4 audits *within each country separately* so that each country serves as its own control.

Our study (based on Compustat, CRSP, I/B/E/S, and Global Vantage data for 1990–99) provides evidence that a Big 4 audit is associated with a lower *ex ante* cost of equity capital in the U.S. but *not* in Australia, Canada, or the U.K. The finding that a Big 4 audit is associated with a lower *ex ante* cost of equity capital only for U.S. auditees holds after controlling for risk factors, auditor self-selection bias, and potential corporate monitoring and governance substitutes such as the managerial and institutional ownership of equity. Thus, our findings suggest that litigation concerns, rather than reputation protection, drive the perceived higher quality and financial reporting credibility of Big 4 audits.

The rest of this paper is organized as follows: In Section II, we discuss prior research on perceived audit quality and financial reporting credibility. In Section III, we state our hypothesis, describe our proxy for financial reporting credibility (the auditee-specific *ex ante* cost of equity capital), and discuss our research design and data. In Section IV, we describe the findings. Section V concludes the paper.

II. AUDIT QUALITY AND CREDIBILITY

As noted by Dopuch and Simunic (1982), audit services are purchased by corporate management rather than by shareholders. Management is required to disseminate financial statements to shareholders, and the value of an audit derives from users' expectations that the auditor will (1) detect and (2) correct/reveal any material omission or misstatements in the financial statements (DeAngelo 1981). The ability to detect material error in the financial statements is a function of auditor competence, while the propensity to correct/reveal the material error is a function of auditor independence from the client.

As discussed in the prior literature (DeAngelo 1981; Palmrose 1988), the quality of an audit is not public information and cannot be directly observed by an external user of financial statements. Consequently, users impute audit quality based on the reputation of the auditor.[4] In general, the Big 4 have sought to differentiate themselves from other auditors by investing more in reputation capital (Beatty 1989), and are viewed as providing higher quality audits based on their perceived (1) competence (by virtue of their heavy spending on auditor training facilities and programs) and (2) independence (by virtue of their size and large portfolio of clients, which presumably gives them the financial strength to stand up to, or walk away from, a client if necessary).

[4] In a market where there are thousands of companies but relatively few auditing firms, it is easier (less costly) for users of financial statements to judge the credibility of the auditor than to judge the credibility of management. However, since all clean (unqualified) audit opinions read the same and the only characteristic of the audit disclosed to users is the auditor's identity, financial reporting credibility is associated solely with the auditor's brand name/reputation (Dopuch and Simunic 1982).

Litigation Risk and Audit Quality

As a practical matter, audit quality generally becomes an issue only for auditees facing financial difficulties. In the litigious environment that prevails in the U.S., investors usually attempt to recover at least some of their losses by suing the auditor. Prior analytical research suggests that audit quality is linked to the level of damages facing the auditor and that, in the absence of litigation risk, the auditor would have little incentive to put in the necessary effort or report truthfully absent reputational concerns (Dye 1993; Melumad and Thoman 1990).

Given potential litigation, the Big 4 are more likely to be sued (and suffer larger damage awards) because of their perceived "deep pockets"; so, litigation is likely to be more costly for these firms in terms of the potential impairment to their brand name reputation capital in which they have invested more (Palmrose 1988). Since they have more to lose in terms of reputation capital and the size of the damage award due to their perceived deeper pockets, litigation risk can be expected to provide the Big 4 an incentive to provide higher quality audits consistent with their brand name reputation (Simunic and Stein 1996).

In a recent paper, Lennox (1999) tries to distinguish between the reputation capital and "deep pockets" hypotheses. He examines U.K. data and finds that (1) large auditors are more likely to be sued and criticized and (2) the demand for large auditors does not appear to fall as a result of criticism (which is consistent with the deep pockets hypothesis and contrary to the reputation hypothesis). Hence, he concludes that large auditors have more to fear from a potential damage award than from damage to reputation, and that it is the fear of litigation (rather than damage to reputation) that drives the presumed higher audit quality of the larger auditors. Lennox (1999, 800) notes that his "conclusion does not contradict the widely held view that large audit firms have reputations for higher quality audits. If investors know that large auditors have deeper pockets, they would know that large auditors have more incentive to issue accurate reports—in this sense, large auditors have better reputations."

Because lawsuits typically allege that earnings and assets were overstated, Basu et al. (2001) suggest that Big 4 auditees report more conservative earnings (i.e., earnings that recognize bad news more quickly than good news) than non-Big 4 auditees. They suggest that the increased timeliness of earnings in recognizing bad news is attained by limiting managerial discretion regarding operating accruals. Basu et al. (2001) indicate that the difference in the conservatism of Big 4 versus non-Big 4 auditee earnings in the U.S. was greater during periods when auditor legal liability exposure was perceived to be greater. Their findings are consistent with the notion that litigation risk drives auditor behavior, and that the greater the litigation risk the more conservative the reported earnings of Big 4 auditees (relative to those of non-Big 4 auditees).[5]

By contrast, Raman and Wilson (1994) suggest that although the risk of auditor moral hazard is greater where the risk of liability is lower, reputation concerns may control moral hazard.[6] For the Big 4, the reputation for excellence in auditing financial statements

[5] Holthausen and Watts (2001) state that conservatism is consistent with a litigation motivation since it is overstatement (rather than understatement) of earnings and assets that is likely to trigger a lawsuit. Ball et al. (2000) and Pope and Walker (1999) suggest that cross-country differences in earnings conservatism are correlated with litigation exposure differences. However, earnings conservatism could also have a contracting motivation in that it ensures that resources are kept within the firm to protect creditors (Watts 2003).

[6] In the context of state and local government audits in the U.S. where litigation risk is minimal or nonexistent, Raman and Wilson (1994) indicate that the proportion of substandard audits (as revealed by detailed federal monitoring of audit work papers as required by the 1984 Single Audit Act) was lower for the Big 4, and that investors price municipal bonds consistent with the notion that the Big 4 provide higher quality audits.

is an important professional asset in retaining current audit clients, attracting new major clients, and in retaining or recruiting outstanding individuals as employees. Moreover, for these large international firms, reputation is an important asset that can help create "market permissions" for new (and potentially lucrative) non-audit assurance services (Elliott 1998, 2). Thus, reputation concerns could provide sufficient incentive for Big 4 auditors to provide higher quality audits in less litigious environments consistent with their brand name reputation.

Finally, although Seetharaman et al. (2002) suggest that audit fees reflect litigation risk differences across liability regimes, their study does *not* address the issue of Big 4 versus non-Big 4 perceived audit quality differences across litigation liability regimes. Thus, to our knowledge, the potential association between cross-border differences in litigation risk and Big 4 versus non-Big 4 perceived audit quality has not been addressed in the prior literature.

As noted previously, perceived audit quality reflects a user (investor) view rather than a preparer view of financial statements. Below, we discuss proxies for perceived audit quality as reflected in the credibility of financial statements.

Proxies for Financial Reporting Credibility

The higher the perceived audit quality, the higher the credibility of the auditee's financial statements. However, "credibility is judged by users" (Dopuch and Simunic 1982, 407). Hence, prior research has sought to represent perceived audit quality through proxies for financial reporting credibility. Thus, Chaney and Philipich (2002) report that questions raised about Enron's accounting during 2001–02 and the resulting damage to the auditor's (Arthur Andersen's) reputation resulted in a statistically significant market decline in the stock price of Andersen's audit clients. Further, the decline was more significant for clients audited by Andersen's Houston office, i.e., the office in charge of the failed Enron audit. Chaney and Philipich (2002) attribute these stock price declines to the notion that a decline in perceived audit quality impairs financial reporting credibility, i.e., results in a lower level of assurance to investors and a higher probability that the reported earnings and book values are overstated. Chaney and Philipich (2002) argue that the stock price decline reflected investors' downgrading of the perceived quality of the audits performed by Andersen. Thus, Chaney and Philipich (2002) link perceived audit quality to financial reporting credibility by utilizing as an observable proxy for impaired credibility the decline in the auditee's stock price around an audit failure.

Separately, other research (Teoh and Wong 1993) has sought empirically to assess financial reporting credibility by measuring investors' response to an earnings surprise. Essentially, this research measures the credibility of a company's reported earnings by the size of the earnings response coefficient (ERC), i.e., the magnitude of the stock market's reaction to unexpected earnings. The intuition underlying this line of research is that an earnings surprise will result in a greater stock price reaction when investors perceive the reported earnings to be more credible. Specifically, Teoh and Wong (1993) hypothesize that to the extent that investors perceive Big 4 auditors as providing higher quality audits, i.e., as reporting more credible earnings for their auditees, the stock price reaction to unexpected reported earnings for Big 4 auditees should be greater than that of other auditees. Consistent with this hypothesis, Teoh and Wong (1993) find the earnings response coefficients of Big 4 auditees to be significantly higher than that of non-Big 4 auditees. Thus, by linking

differences in financial reporting credibility to the ERC, they provide evidence that financial statements audited by the Big 4 are more credible.[7]

As noted previously, in this study we utilize an estimable proxy—the client-specific *ex ante* cost of equity capital—for financial reporting credibility and, by implication, perceived audit quality. Prior research (e.g., Botosan 1997; Leuz and Verrecchia 2000) has examined the association between the cost of equity capital and disclosure. Unlike Leuz and Verrecchia (2000), who examine proxies for the cost of equity capital such as the bid-ask spread and trading volume, we directly estimate the cost of equity capital. As noted by Joos (2000, 132), recent evidence suggests that the bid-ask spread may not be a good proxy for the information asymmetry component of the cost of equity capital. Also, the advantage in using the *ex ante* cost of equity capital is that it predominantly captures long-term information asymmetry, unlike trading volume and bid-ask spreads that are likely very sensitive to short-term information asymmetry. This is an important point because hiring a Big 4 auditor essentially amounts to a long-term commitment to higher financial statement quality. For these reasons, in this study, we directly infer the cost of equity capital and use it in our analysis. Our proxy for financial reporting credibility is discussed further in the next section.

III. HYPOTHESIS, RESEARCH DESIGN, AND DATA

Hypothesis

Prior research (e.g., Amihud and Mendelson 1986; Lee et al. 1993) suggests that information asymmetry between a firm and its investors is associated with increased transaction costs (i.e., higher bid-ask spreads) due to adverse selection, reduced market liquidity, investor reluctance to hold the less-liquid stock, and a discount in the price of the stock indicating a higher cost of equity capital for the firm. From an investor perspective, prior research (e.g., Slovin et al. 1990; Watts and Zimmerman 1986) also suggests that an audit ameliorates the valuation problem caused by private information and that the reputation of the auditor can reduce investor uncertainty and lower perceived risk. Stated differently, more credible financial reporting is expected to lower the perceived information asymmetry between the firm and its current and potential stockholders, and in turn lower the information asymmetry component of the firm's cost of equity capital. Consistent with this argument, Francis et al. (2002, 2003) report that higher earnings quality is associated with a lower cost of equity capital. Thus, the perceived enhanced assurance provided by a Big 4 audit is expected to provide the client with a tangible benefit in the form of a lower *ex ante* cost of equity capital.

In this study, we examine the association between a Big 4 audit and the auditee-specific *ex ante* cost of equity capital using U.S. data as well as data from three other Anglo-American countries (Australia, Canada, and the U.K.).[8] As noted previously, although the economic role of the auditor in other Anglo-American countries is similar to that in the

[7] The use of the earnings response coefficient (ERC) as a proxy for financial reporting credibility entails measurement of the market reaction to unexpected earnings. Since we did not have access to daily stock return data and earnings announcement dates for non-U.S. firms, it was not possible for us to use the ERC metric in our study. More importantly, if Big 4 and non-Big 4 auditee earnings have different time-series properties (Basu et al. 2001), then it may be inappropriate to use a common measure for unexpected earnings. Potentially, Teoh and Wong's (1993) results may reflect the different properties of unexpected earnings between Big 4 and non-Big 4 auditees rather than differing financial reporting credibility.

[8] For New Zealand (also an Anglo-American country), the number of firm-year observations was too few for us to include that country in our study. Hence, we include only Australia, Canada, and the U.K. as comparison countries.

U.S., these countries are far less litigious relative to the U.S. Stated differently, the U.S. and the other Anglo-American countries all have developed economies and a legal system based on English (common) law that offers the most protection to outside (minority) stockholders from expropriation by corporate insiders such as managers or controlling stockholders. In turn, the greater protection increases the willingness of outsiders (including small investors) to invest their savings in exchange for securities. As a result, firms in these countries are more oriented to external finance, resulting in these countries having larger stock markets.

Moreover, firms in these countries tend to have individually small (but collectively large) diversified stockholders and thus less concentrated ownership of shares (La Porta et al. 1997, 1998). Thus, much of the equity capital is raised from outsiders who are *not* privy to inside information. In turn, widely dispersed ownership is associated with greater demand for (and thus supply of) timely public disclosure for monitoring the performance of management through the medium of publicly available financial statements (Ball et al. 2000). In other words, the institutional details in these countries are fairly similar so that the economic role of the independent audit is similar.

To neutralize the possible confounding effects of other cross-border differences (if any) among these countries, we test our hypothesis *within each country separately* so that each country serves as its own control. Also, as discussed previously, prior analytical research suggests that audit quality is linked to the level of damages facing the auditor, i.e., litigation risk drives auditor behavior. Moreover, since Big 4 auditors are perceived to have deeper pockets and have more to lose in terms of the size of the damage award, litigation risk is expected to provide Big 4 auditors an incentive to provide higher quality audits consistent with their brand name reputation. If perceived audit quality is driven by reputation concerns, then a Big 4 audit should be associated with a lower auditee-specific *ex ante* cost of equity capital in all litigation risk environments, i.e., in the U.S. as well as in the other Anglo-American countries. By contrast, if perceived audit quality is driven by litigation risk, then a Big 4 audit should be associated with a lower auditee-specific *ex ante* cost of equity capital in the high litigation risk U.S. environment but *not* in the less litigious environments in Australia, Canada, and the U.K. Formally stated, our hypothesis is as follows:

H1: A Big 4 audit is associated with a lower auditee-specific *ex ante* cost of equity capital in the U.S. but not in Australia, Canada, or the U.K.

The *Ex Ante* Cost of Equity Capital

The cost of equity capital is an *ex ante* metric, i.e., a measure of *expected* (rather than realized) returns, and thus not observable.[9] In this study, we utilize the PEG approach suggested by Easton (2004) to estimate the firm-specific *ex ante* cost of equity capital. Botosan and Plumlee (2002) examine five alternative estimates of the firm-specific cost of equity capital, and conclude that the PEG approach is to be preferred since, unlike other approaches, it (1) provides firm-specific estimates that correlate with risk measures (such as the stock beta) in a consistent and theoretically expected direction and (2) has the added advantages of having less onerous data requirements and being less computationally complex.

[9] Cost of capital estimates based on *ex post* (realized) returns have proved imprecise (Fama and French 1997). Separately, Elton (1999, 1199) notes that "realized returns are a very poor measure of expected returns" and discusses the problems in prior research associated with relying on realized returns as a proxy for expected returns.

The PEG approach is based on a model of earnings and earnings growth, and is consistent with analysts' pervasive focus on forecasts of earnings and earnings growth.[10] Under this approach, the firm specific *ex ante* cost of equity capital is estimated as the square root of the inverse of the price-earnings growth ratio. Specifically:

$$r_e = \sqrt{\frac{eps_2 - eps_1}{P_0}}$$

where:

r_e = the *ex ante* cost of equity capital;
eps_1 = the one-year ahead mean analysts' earnings forecast per share;
eps_2 = the two-year ahead mean analysts' earnings forecast per share; and
P_0 = the fiscal year-end price per share.[11]

The Regression Model

The regression model (analyzed on a country-by-country basis) is as follows:

$$r_e = f\,(YR, IND, BETA, ln(LEV), VAR, ln(SIZE), ln(B/M), GRWTH, B4). \quad (1)$$

The variables in model 1 are defined below:

Dependent Variable:

r_e = auditee-specific *ex ante* cost of equity capital estimated using the PEG approach suggested by Easton (2004) and discussed in Botosan and Plumlee (2002).

Control Variables:

YR = dummy variables indicating the year of observation over the 1990–1999 period;
ND = dummy variables indicating the industry of the auditee firm;
$BETA$ = stock beta (systematic risk) calculated over 36 months ending in the month of the fiscal year-end;
$ln(LEV)$ = natural log of financial leverage measured by the debt-to-asset ratio as of fiscal year-end;
VAR = Earnings variability measured by the dispersion in analysts' earnings forecasts available on I/B/E/S during the fiscal year-end month;
$ln(SIZE)$ = natural log of size of the firm measured by the market value of common equity (in million of dollars) as of fiscal year-end;
$ln(B/M)$ = natural log of the ratio of book value of equity to market value of equity as of fiscal year-end; and

[10] By contrast, the residual income valuation model approach to estimating the *ex ante* cost of equity capital (e.g., Claus and Thomas 2001; Gebhardt et al. 2001; Ohlson 1995) relies on book value and the clean surplus relation. However, analysts do not forecast book values or book value growth. We also did the analyses using the residual income valuation model as well as the Ohlson and Juettner-Nauroth (2000) model. The results of the alternative analyses are similar to the findings reported in the paper.

[11] As an example, for a firm-year observation with fiscal year ending on December 31, 1994, we use as eps_1 and eps_2 the earnings forecasts (available on I/B/E/S as of December 1994) for fiscal years ending December 31, 1995 and 1996, respectively. P_0 is the December 31, 1994 closing price.

GRWTH = forecasted growth measured as the difference between the mean analysts' two- and one-year ahead earnings forecasts scaled by the one-year ahead earnings forecast.

Test Variable:

B4 = dummy variable equal to 1 for a Big 4 audit, 0 otherwise.

Since the cost of equity capital can vary over time, we control for the year of the observation (*YR*). Also, because some industries are perceived to be more risky than others, we control for industry specific risk using industry dummies (*IND*). We include the stock beta (*BETA*) as an explanatory variable, because the capital asset pricing model (CAPM) suggests that systematic risk (beta) is positively correlated with the cost of equity capital. Hence, *BETA* is expected to have a positive sign. Consistent with the prior literature (e.g., Modigliani and Miller 1958; Gebhardt et al. 2001), the greater the financial leverage, the greater the perceived risk in the firm and the higher the cost of equity capital. Hence, *LEV* is expected to have a positive sign. Moreover, the variability in reported earnings may be perceived as a source of risk for firm valuation (Gebhardt et al. 2001). Hence, the greater the variability in earnings, the greater the perceived risk. In this study, we utilize the dispersion in analysts' forecasts of earnings (*VAR*) as a proxy for earnings variability. In the regressions, *VAR* is expected to have a positive sign. Also, beginning with Banz (1981) there is a large body of research that indicates a negative association between firm size (as measured by the value of equity) and realized stock returns. Berk (1995) suggests that the negative association between firm size and realized returns is attributable to the notion that market value is inversely associated with risk in general. Consequently, and consistent with Botosan and Plumlee (2002), *SIZE* is expected to have a negative sign. In addition, given the risk interpretation of the book-to-market ratio in Fama and French (1995), we include *B/M* as a control variable. The higher the book-to-market ratio, the higher the risk factor. Hence, *B/M* is expected to have a positive sign.[12] Also, Beaver et al. (1970) and La Porta (1996) suggest that earnings derived from growth opportunities are more uncertain than normal earnings, and that there is a positive association between growth and risk. For this reason, *GRWTH* is expected to have a positive sign.[13] Collectively, in our model, variables *BETA* through *GRWTH* are intended to control for equity risk. Finally, as hypothesized previously, if perceived audit quality is driven by litigation risk, then the predicted sign for *B4* is negative in the U.S. regression but not in the regressions for the other Anglo-American countries.

Sample Selection

Our U.S. sample consists of nonfinancial firms (SIC codes other than 6000–6999) from the intersection of (1) I/B/E/S, (2) a merged Compustat annual industrial file, including

[12] Consistent with Gebhardt et al. (2001), we log transform the leverage (*LEV*), size (*SIZE*), and book-to-market (*B/M*) variables to correct for skewness and to minimize the influence of outliers.

[13] Botosan and Plumlee (2002) define growth as the difference between Value Line's five- and four-year ahead earnings forecasts scaled by the four-year ahead earnings forecast. However, (1) our universities do not subscribe to the (rather costly) machine-readable versions of the Value Line forecasts, and (2) to our knowledge, the Value Line forecasts are not available for non-U.S. firms and thus are not usable in the context of an international study such as ours. Hence, consistent with Lee and Ng (2002), we estimate growth based on analysts' two- and one-year ahead earnings forecasts.

PST, full coverage and research files, and (3) monthly return files from the Center for Research in Security prices (CRSP) for 1990–99. Our samples for Australia, Canada, and the U.K. consist of nonfinancial firms (SIC codes other than 6000–6999) from the intersection of (1) the I/B/E/S International database, and (2) the Global Vantage Industrial Commercial File and Issue Files for 1990–99. For each firm-year, we impose the criteria that the firm must have available (1) the one- and two-year ahead consensus (mean) analysts' earnings forecasts, or the one-year ahead consensus (mean) analysts' earnings forecast and a forecast of growth in earnings for the subsequent year, (2) the current stock price, (3) fully consolidated financial statements (as indicated by both Global Vantage and I/B/E/S) covering a 12-month period, and (4) necessary data for the explanatory variables included in our regression model.[14]

IV. EMPIRICAL FINDINGS

Table 1 provides information on the number of observations in our sample and descriptive statistics for the dependent variable—the *ex ante* cost of equity capital (r_e). Panel A provides information on the number of observations (by country) for each of the ten years (1990–99) included in our study. As can be seen from Panel A, the number of firm-year observations for the U.S. (15,817) is much larger than the number of observations for Australia (579), Canada (945), or the U.K. (2,176). In Panel B, the individual-country samples are pooled across years and partitioned by type of auditor (Big 4 versus non-Big 4). In the U.S. and in Canada, the market dominance of the Big 4 is clear in that in both countries the number of non-Big 4 audits is less than 7 percent of the number of Big 4 audits. By contrast, the Big 4 are less dominant in Australia and the U.K., although the number of Big 4 audits still far exceeds the number of non-Big 4 audits.

TABLE 1
Number of Observations and Descriptive Statistics for the Dependent Variable

Panel A: Number of Observations (by country and by year)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total
U.S.	1197	1260	1212	1375	1567	1710	1885	1982	2013	1616	15817
Australia	10	9	30	38	53	63	68	97	103	108	579
Canada	57	51	64	82	87	92	119	127	138	128	945
U.K.	37	84	96	152	184	217	279	355	369	403	2176
Total	1264	1320	1306	1495	1707	1865	2072	2206	2254	1852	19517

Panel B: Descriptive Statistics for the Dependent Variable (*ex ante* cost of equity capital)

	Big Audits				Non-Big Audits			
Country	n	Mean	Median	Std. Dev.	n	Mean	Median	Std. Dev.
U.S.	15269	0.119	0.113	0.04	548	0.132	0.126	0.04
Australia	508	0.103	0.091	0.05	71	0.107	0.097	0.05
Canada	884	0.119	0.110	0.05	61	0.121	0.112	0.06
U.K.	1933	0.106	0.097	0.04	243	0.112	0.107	0.04

[14] Also, the PEG approach (Botosan and Plumlee 2002) requires the earnings forecasts to be positive and for the two-year ahead earnings forecast to exceed the one-year ahead forecast.

Panel B of Table 1 indicates that on average the *ex ante* cost of equity capital for Big 4 (relative to non-Big 4) auditees is lower in all four countries, although the difference (i.e., a lower mean and median) is statistically significant (at the 0.01 level) only for the U.S. and the U.K. However, as discussed previously, the cost of equity capital for an auditee could potentially be influenced by the year of the observation as well as auditee-specific risk factors such as the industry in which the firm operates, the stock beta, financial leverage, earnings variability, size, the book-to-market ratio, and growth.

Table 2 presents descriptive statistics for the control variables *BETA* (the stock beta), *LEV* (financial leverage), *VAR* (earnings variability), *SIZE* (size of the auditee), *B/M* (the book-to-market ratio), and *GRWTH* (growth), by country and by type of auditor (Big 4 versus non-Big 4). As discussed previously, for *BETA*, *LEV*, *VAR*, *B/M*, and *GRWTH*, the higher the value of the variable, the *higher* the perceived risk in the client firm. However, for *SIZE*, the higher the value of the variable, the *lower* the perceived risk.

In Table 2, across all 4 countries, the average value of SIZE for Big 4 (relative to non-Big 4) auditees is uniformly higher (and statistically significant at the 0.01 level) indicating that, on average, the Big 4 attract *larger* client firms, i.e., *less* risky firms. By contrast (for the U.S. and the U.K.), for the control variables *LEV* and *VAR* the evidence suggests that Big 4 auditees may in general be *more* risky than non-Big 4 auditees, i.e., the mean and median values of these variables are significantly higher (at the 0.01 level). Thus, although the univariate evidence (discussed previously) suggests that the cost of equity capital is significantly lower for Big 4 (relative to non-Big 4) auditees in the U.S. and the U.K., there is no consistent evidence to suggest that the Big 4 attract less risky audit clients. In our multivariate regression analysis discussed below, we control for these auditee-specific risk factors in examining the association between the *ex ante* cost of equity capital for an auditee and a Big 4 audit.

Table 3 presents the regression results on a country-by-country basis.[15] These regressions examine whether a Big 4 audit is associated with a lower *ex ante* cost of equity capital for the auditee.[16] Our regression model includes year (*YR*) and industry (*IND*) dummies; for brevity, the year-specific and industry-specific intercepts are not reported in Table 3. In the regressions, *BETA*, *LEV*, *VAR*, *SIZE*, *B/M*, and *GRWTH* are associated with the cost of equity capital with the expected signs. Thus, consistent with Botosan and Plumlee (2002), our *ex ante* cost of equity capital estimates—obtained using the PEG approach—are associated with the traditional risk measures in the expected direction.

Our main interest is in whether a Big 4 audit is associated with a lower *ex ante* cost of equity capital for the auditee. Hence, our focus is on the dummy variable *B4*. If, in fact, investors perceive Big 4 auditors to be providing a higher quality audit and more credible client financial statements (relative to non-Big 4 auditors in that same country), then firms audited by the Big 4 should be perceived *ceteris paribus* as having lower risk and thus should have a lower *ex ante* cost of equity capital. For the U.S., *B4* is significant with the predicted negative sign indicating that a Big 4 audit is associated with a lower *ex ante* cost of equity capital. However, for the other Anglo-American countries in our study, *B4* is *not*

[15] For all of the regressions discussed in this paper, we plotted the residuals against each of the explanatory variables. These plots did not show a nonlinear pattern, and suggested a linear relation between our dependent variable (the *ex ante* cost of equity capital) and the independent variables.

[16] An examination of the variance inflation factors (VIFs) in the various country-by-country regressions revealed the *highest* VIF (in any regression) for the test variable *B4* to be only 2.15, far below the level of 10.0 that is regarded as indicating a significant collinearity problem (Neter et al. 1996). The low VIFs suggest that collinearity is not a serious problem in interpreting the empirical results for the test variable *B4*.

TABLE 2
Descriptive Statistics for Explanatory Variables by Country and by Type of Auditor (Big 4 versus non-Big 4)[a]

Panel A: U.S.

	Big 4 Audits (n = 15269)			Non-Big 4 Audits (n = 548)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
BETA	0.983	0.941	0.691	1.025	1.020	0.801
LEV	0.198	0.181	0.174	0.153	0.084	0.171
VAR	0.102	0.060	0.154	0.076	0.050	0.095
SIZE	3045.320	486.205	12951.870	456.538	170.065	852.804
B/M	1.686	0.461	10.654	0.929	0.470	6.012
GRWTH	0.235	0.190	0.170	0.252	0.219	0.154

Panel B: Australia

	Big 4 Audits (n = 508)			Non-Big 4 Audits (n = 71)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
BETA	0.948	0.905	0.443	0.871	0.826	0.434
LEV	0.192	0.197	0.126	0.173	0.168	0.127
VAR	0.030	0.022	0.027	0.032	0.015	0.062
SIZE	1711.630	579.548	3786.630	493.613	154.370	881.541
B/M	0.831	0.579	4.421	0.635	0.525	0.383
GRWTH	0.180	0.133	0.161	0.161	0.107	0.176

Panel C: Canada

	Big 4 Audits (n = 884)			Non-Big 4 Audits (n = 61)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
BETA	0.895	0.863	0.597	0.731	0.586	0.582
LEV	0.227	0.226	0.157	0.205	0.167	0.149
VAR	0.162	0.110	0.191	0.126	0.070	0.173
SIZE	1211.610	487.046	2743.980	546.036	215.311	1281.940
B/M	0.878	0.863	4.739	0.866	0.819	0.481
GRWTH	0.258	0.200	0.202	0.251	0.166	0.243

Panel D: U.K.

	Big 4 Audits (n = 1933)			Non-Big 4 Audits (n = 243)		
Variable	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
BETA	0.895	0.889	0.509	0.778	0.787	0.527
LEV	0.142	0.116	0.143	0.103	0.086	0.093
VAR	0.016	0.011	0.019	0.012	0.009	0.011
SIZE	3054.460	616.748	10503.070	824.773	267.710	2276.400
B/M	0.443	0.426	0.196	0.383	0.415	0.238
GRWTH	0.160	0.125	0.129	0.175	0.142	0.119

[a] Raw values for variables *LEV*, *SIZE* (in millions of dollars), and *B/M* are shown for descriptive purposes only; the logarithmic form is used in the regressions.

TABLE 3
Regression Results

Dependent Variable: *Ex ante* Cost of Equity Capital[a]

	Parameter Estimates (t-statistics in parentheses)								
Country	**Intercept (?)**	***BETA* (+)**	***ln(LEV)* (+)**	***VAR* (+)**	***ln(SIZE)* (−)**	***ln(B/M)* (+)**	***GRWTH* (+)**	***B4* (−)**	**Adjusted R^2**
U.S.	0.164	0.001	0.003	0.003	−0.005	0.007	0.179	−0.003	0.63
(n = 15817)	(25.67)***	(1.79)**	(16.96)***	(2.39)***	(−32.96)***	(27.98)***	(107.36)***	(−3.09)***	
Australia	0.144	0.005	0.003	0.131	−0.008	0.012	0.199	−0.001	0.70
(n = 579)	(12.07)***	(2.01)**	(2.63)***	(4.08)***	(−9.60)***	(6.62)***	(28.43)***	(−0.60)	
Canada	0.100	0.003	0.001	0.031	−0.005	0.009	0.158	0.002	0.65
(n = 945)	(12.64)***	(1.68)**	(1.29)*	(5.74)***	(−6.51)***	(5.24)***	(32.24)***	(0.49)	
U.K.	0.232	0.002	0.002	0.139	−0.007	0.003	0.247	0.003	0.68
(n = 2176)	(11.61)***	(2.33)***	(4.49)***	(4.66)***	(−18.47)***	(8.89)***	(58.12)***	(1.13)	

*, **, *** Significant at the 0.10, 0.05, and 0.01 levels (one-tailed, except for the intercept), respectively.

[a] Regression with *ex ante* cost of equity capital (r_e) as the dependent variable. The control variables in the regression are as follows: *BETA* is stock beta (systematic risk) calculated over 36 months ending in the month of the fiscal year-end; *ln(LEV)* is the natural log of financial leverage measured by the debt-to-asset ratio as of fiscal year-end; VAR is the earnings variability measured by the dispersion in analysts' earnings forecasts available on I/B/E/S during the fiscal year-end month; *ln(SIZE)* is the natural log of size of the firm measured by the market value of common equity (in million of dollars) as of fiscal year-end; *ln(B/M)* is the natural log of ratio of book value of equity to market value of equity as of fiscal year-end; and *GRWTH* is the forecasted growth measured as the difference between the mean analysts' two- and one-year ahead earnings forecasts scaled by the one-year ahead earnings forecast. The test variable *B4* is a dummy variable equal to 1 for a Big 4 audit, 0 otherwise.

For brevity, the year-specific and industry-specific intercepts are not reported.

significant. Thus, the results reported in Table 3 suggest that a Big 4 audit is associated with a lower *ex ante* cost of equity capital for auditees in the U.S. but not in Australia, Canada, or the U.K.[17]

As noted previously (in the context of Table 1), in our study the U.S. sample is much larger than the samples for Australia, Canada, or the U.K. Potentially, our conclusion that *B4* is significant for the U.S. sample could simply be a function of the greater statistical power associated with the much larger U.S. sample. Hence, we utilize the methodology discussed in Alford et al. (1993) and Ali and Hwang (2000) to form U.S. samples randomly selected from the existing U.S. sample and constrained in size to the number of observations in the Australia, Canada, and U.K. samples. Specifically, consistent with Alford et al. (1993) and Ali and Hwang (2000), we control for differences in year, industry, and market capitalization by randomly selecting 100 U.S. samples matched by year, industry, and size quintile with the Australia, Canada, and U.K. samples. Also consistent with Alford et al. (1993) and Ali and Hwang (2000), a U.S. firm may appear in more than one matched sample but never more than once in any matched sample.

Table 4 presents the regressions results for Australia, Canada, and U.K. followed by the median results for the 100 randomly selected matched U.S. samples for that country. Once again, in Table 4 the year-specific and industry-specific intercepts are omitted for brevity. The results for Australia, Canada, and the U.K. are the same as those reported in Table 3, and are repeated in Table 4 merely for ease of comparison with the results reported for the matched U.S. sample. For example, the results for Australia (from Table 3) are reported in the first row and the results for the matched U.S. sample are reported in the next row. For the matched U.S. sample for Australia, the control variables *BETA* (stock beta) through *GRWTH* (growth) are all significant with the anticipated signs. In addition, *B4* is significant with the predicted negative sign indicating that a Big 4 audit is associated with a lower *ex ante* cost of equity capital for auditees in the U.S. Since the size of the matched U.S. sample is constrained to be the same as for the Australia sample (n = 579), the results for the U.S. sample (in comparison with the Australia sample) are not affected by differential statistical power due to sample size differences.

Similar findings are reported in Table 4 for the matched U.S. samples for Canada and the U.K. In each case, *B4* is significant with a negative sign for the matched U.S. sample indicating that a Big 4 audit is associated with a lower *ex ante* cost of equity capital for auditees in the U.S. Collectively, the findings from Table 4 are consistent with the findings from Table 3, i.e., a Big 4 audit is associated with a lower *ex ante* cost of equity capital

[17] For the U.S. sample (where the test variable *B4* is significant), the market-based control variables are likely to be endogenously affected by perceived audit quality. For example, if a Big 4 audit results in a lower cost of equity capital, then for two firms with the same cash flows, the Big 4 client will have a higher equity value, which would affect the firm size and the book-to-market control variables. For the U.S. sample, we estimated model 1 using only *non*-Big 4 audited firms and applied the resulting coefficients to all observations (both Big 4 and non-Big 4). The correlation between the residual values for all observations and the *B4* dummy variable was negative and significant at the 0.01 level, suggesting that the residual component of the cost of equity capital is lower for Big 4 audits. Thus, the results from this alternative specification were similar to the results reported in Table 3 and suggest that a Big 4 audit is associated with a lower auditee-specific cost of equity capital in the U.S. Further, as part of additional analyses (discussed below), we control for potential auditor self-selection bias for the U.S. sample where variable *B4* is significant.

TABLE 4
Regression Results for Matched U.S. Sample[a]

Dependent Variable: *Ex ante* Cost of Equity Capital[b]

Country	Parameter Estimates (t-statistics in parentheses) Intercept (?)	*BETA* (+)	*ln(LEV)* (+)	*VAR* (+)	*ln(SIZE)* (−)	*ln(B/M)* (+)	*GRWTH* (+)	*B4* (−)	Adjusted R^2
Australia (n = 579)	0.144 (12.07)***	0.005 (2.01)**	0.003 (2.63)***	0.131 (4.08)***	−0.008 (−9.60)***	0.012 (6.62)***	0.199 (28.43)***	−0.001 (−0.60)	0.70
Matched U.S. sample (n = 579) for Australia	0.143 (89.2)***	0.001 (1.95)**	0.003 (32.3)***	0.023 (25.1)***	−0.007 (−77.7)***	0.007 (55.2)***	0.172 (137.1)***	−0.006 (−2.59)***	0.61
Canada (n = 945)	0.100 (12.64)***	0.003 (1.68)**	0.001 (1.29)*	0.031 (5.74)***	−0.005 (−6.51)***	0.009 (5.24)***	0.158 (32.24)***	0.002 (0.49)	0.65
Matched U.S. sample (n = 945) for Canada	0.126 (152.8)***	0.001 (7.90)***	0.001 (20.6)***	0.011 (14.3)***	−0.004 (−77.1)***	0.007 (46.6)***	0.180 (236.3)***	−0.007 (−15.1)***	0.63
U.K. (n = 2176)	0.232 (11.61)***	0.002 (2.33)***	0.002 (4.49)***	0.139 (4.66)***	−0.007 (−18.47)***	0.003 (8.89)***	0.247 (58.12)***	0.003 (1.13)	0.68
Matched U.S. sample (n = 2176) for U.K.	0.149 (242.9)***	0.001 (3.01)***	0.003 (81.2)***	0.008 (11.6)***	−0.005 (−143.1)***	0.006 (75.8)***	0.173 (278.6)***	−0.003 (−11.5)***	0.61

*, **, *** Significant at the 0.10, 0.05, and 0.01 levels (one-tailed, except for the intercept), respectively.

[a] Consistent with the methodology used by Alford et al. (1993) and Ali and Hwang (2000), the matched U.S. sample results represent the median results for the 100 randomly selected U.S. samples matched by year, industry, and size quintile for Australia, Canada, and U.K.

[b] Regression with *ex ante* cost of equity capital (r_e) as the dependent variable. The control variables in the regression are as follows: *BETA* is stock beta (systematic risk) calculated over 36 months ending in the month of the fiscal year-end; *ln(LEV)* is the natural log of financial leverage measured by the debt-to-asset ratio as of fiscal year-end; *VAR* is the earnings variability measured by the dispersion in analysts' earnings forecasts available on I/B/E/S during the fiscal year-end month; *ln(SIZE)* is the natural log of size of the firm measured by the market value of common equity (in million of dollars) as of fiscal year-end; *ln(B/M)* is the natural log of ratio of book value of equity to market value of equity as of fiscal year-end; and *GRWTH* is the forecasted growth measured as the difference between the mean analysts' two- and one-year ahead earnings forecasts scaled by the one-year ahead earnings forecast. The test variable *B4* is a dummy variable equal to 1 for a Big 4 audit, 0 otherwise.

For brevity, the year-specific and industry-specific intercepts are not reported.

for auditees in the U.S. but not in Australia, Canada, or the U.K. For the U.S. sample, *B4* appears to be economically as well as statistically significant.[18]

Additional Analyses

Control for Auditor Self-Selection Bias

Because our study is not a laboratory experiment where auditees (within individual countries) are randomly assigned to Big 4 and non-Big 4 auditors, there is the potential (as in prior archival studies) for auditor self-selection bias that could confound the results. Prior research (e.g., Johnstone 2000; Raghunandan and Rama 1999) suggests that Big 4 auditors are likely to self-select less risky audit clients to reduce their litigation risk. If this screening argument is correct, we would expect Big 4 auditees to be less risky (relative to non-Big 4 auditees) and to have a lower *ex ante* cost of equity capital, even if Big 4 auditors are not perceived by investors as providing more credible financial statements. Under this interpretation, *B4* is merely a proxy for some omitted risk factor that is uncorrelated with the six other risk factors that we control for in Model (1). The screening argument also predicts that risk differences between Big 4 and non-Big 4 auditees are a function of litigation liability exposure, and is consistent with our finding that Big 4 auditees have a significantly lower cost of equity capital only in the U.S.[19]

Because *B4* is significant only in the U.S. and not in Australia, Canada, or the U.K., self-selection bias as a confounding variable is an issue only for the U.S. sample. In additional analysis, we attempt to control for self-selection bias in the U.S. Specifically, based on the auditor selection model discussed in Francis et al. (1999), we estimate the following logistic model:

$$B4 = f(SHORT, LONG, ln(SALES), LEV, P/E, ISSUE, LOSS). \quad (2)$$

In Model (2), *B4* is a dummy variable equal to 1 for a Big 4 auditor, and equal to 0 otherwise. As discussed at length in Francis et al. (1999), the independent variables attempt to capture a number of factors expected to influence a firm's choice of auditor. These explanatory variables are as follows: *SHORT* (the absolute value of short-term accruals in income, scaled by sales), *LONG* (the absolute value of long-term accruals in income, scaled by sales), *ln(SALES)* (the natural log of sales), *LEV* (long-term liabilities divided by total assets), *P/E* (the price earnings ratio), *ISSUE* (new equity issue, 1 if change in equity

[18] In Tables 3 and 4, the *smallest* absolute coefficient for *B4* in any U.S. regression is 0.003 indicating that as the value of the *B4* dummy changes from 0 to 1 (or from 1 to 0), the cost of equity capital decreases (increases) by at least 3/10ths of 1 percent or 30 basis points. Considering that the median size (equity value) of non-Big 4 auditees (from Table 2 panel A) is $170 million, a decrease in the cost of equity capital of 30 basis points should have an economically significant dollar impact on equity value. From the perspective of Big 4 auditees, the dollar impact of a switch to a non-Big 4 auditor should be much greater since the median size for Big 4 client firms is considerably higher at $486 million.

[19] Managers have incentives to disclose bad news promptly to reduce litigation risk, and an alternative interpretation of the lower cost of capital in the U.S. is that this reflects quicker disclosure of bad news by managers who hire Big 4 auditors. However, one could argue that disclosure of bad news should *increase* (rather than decrease) the perceived equity risk and, hence, the cost of equity capital. Separately, managers with greater liability risk may be more likely to hire higher quality auditors as a self-insurance measure. However, as pointed out by Basu et al. (2001, 30), "because managers select auditors, and ... auditors select clients, it is difficult to separate out the effects of managers' incentives from those of auditors ..." Thus, as a practical matter, it is difficult to disentangle the endogeneity between managerial and auditor liability exposures. Moreover, consistent with Basu et al. (2001), one could argue that since firms typically buy liability insurance for their officers, managers may be less sensitive than auditors to liability risk.

> 10 percent, 0 otherwise), and *LOSS* (1 if current net income < 0 and absolute change in income > 10 percent, 0 otherwise).

We use logistic regression to estimate Model (2) to explain the choice of a Big 4 versus non-Big 4 auditor for our U.S. sample. We then obtain the fitted values from the logistic regression and calculate the inverse Mills ratio (Heckman 1979). The inverse Mills ratio (IMR) is then used as an additional explanatory variable in Model (1) to correct for potential self-selection bias.

In Table 5, columns 3 and 4 present the results for the logistic regression relating to auditor choice. The overall regression is significant at the 0.01 level, and the explanatory variables that are significant have predicted signs consistent with Francis et al. (1999). Also in Table 5, columns 5 and 6 present the regression results for Model (1) expanded to include the inverse Mills ratio (IMR) as an additional explanatory variable intended to control for self-selection bias. In this expanded model, the control variables from Model (1)—*BETA*, *ln(LEV)*, *VAR*, *ln(SIZE)*, *B/M*, and *GRWTH*—where significant have the predicted signs. In addition, variable IMR is significant. More to the point, *B4* is still significant with a negative sign, indicating that Big 4 auditees in the U.S. have a lower *ex ante* cost of equity capital even after controlling for potential self-selection bias.[20]

Control for Potential Monitoring and Corporate Governance Substitutes

A Big 4 audit is only one of many potential monitoring and corporate governance substitutes that firms may choose to minimize the cost of their equity capital. Thus, predictions for the cost of equity capital from a Big 4 audit might be difficult to make without controlling for other choices in the corporate governance portfolio.

Once again, since *B4* is significant only in the U.S. and not in Australia, Canada, or the U.K., other corporate governance mechanisms as omitted correlated variables is an issue only for the U.S. sample. In additional analysis, we attempt to control for two other choices

[20] These findings are consistent with prior research (Becker et al. 1998; Francis and Krishnan 1999; Francis et al. 1999; Krishnan 1994) that suggests that the brand name reputation of the Big 5 is based on the actual higher quality of their audits and is *not* simply a result of self-selection. Specifically, although accrual-basis earnings are regarded as more informative than cash-basis earnings, there is a large element of subjectivity in estimating accruals. Becker et al. (1998) and Francis et al. (1999) indicate that a Big 4 audit improves the credibility of reported earnings by constraining managerial discretion regarding accounting choices; as a result, Big 4 auditees have smaller amounts of discretionary accruals. In particular, Francis et al. (1999) suggest that managers of high-accrual firms have an incentive to hire a Big 4 auditor to convey the credibility of their reported earnings since Big 4 auditors have a superior ability to limit aggressive and potentially opportunistic reporting of accruals to manage earnings. Their evidence indicates that as accruals increase, Big 4 auditors are demanded because of the greater assurance provided by their ability to apply GAAP in a reasonable and unbiased manner. Thus, Francis et al. (1999, 32) suggest that the consequence of using a Big 4 auditor is to constrain aggressive and opportunistic reporting, and that the brand name reputation of the Big 4 is based on the actual higher quality of their audits and is *not* simply a result of self-selection.

In the same vein, Krishnan (1994) suggests that auditors acquire client-specific private information (such as the deterioration of internal controls or the loss of key customers) during an audit, and that based on the same client-specific private information, Big 4 auditors are more likely than non-Big 4 auditors to issue modified opinions. Francis and Krishnan (1999) suggest that income-increasing accruals are more likely to trigger modified opinions than income-decreasing accruals, and that Big 4 auditors show evidence of reporting conservatism, i.e., a higher frequency of modified opinions. They suggest that a lower threshold for issuing a modified audit report is another reason why Big 4 audits are perceived to be more credible.

TABLE 5
Results of Additional Analyses for U.S. Sample

		Dependent Variable					
		B5 Dummy[a]		*Ex ante* Cost of Equity Capital[b]			
Variable	Predicted Sign	Parameter Estimate	Chi-square statistic	Predicted Estimate	t-statistic	Parameter Estimate	t-statistic
Intercept	?	0.196	3.07**	0.141	31.27***	0.137	27.90***
SHORT	+	−0.116	0.21				
LONG	+	3.756	30.52***				
ln(SALES)	+	0.229	149.1***				
LEV	+	0.004	0.01				
P/E	+	0.003	12.06***				
ISSUE	+	−0.072	1.17				
LOSS	−	0.311	1.23				
BETA	+			0.001	0.67	0.001	0.29
ln(LEV)	+			0.003	12.47***	0.002	11.95***
VAR	+			0.001	0.48	0.009	3.58***
ln(SIZE)	−			−0.005	−19.51***	−0.005	−18.35***
ln(B/M)	+			0.009	25.09***	0.010	22.60***
GRWTH	+			0.196	125.1***	0.191	107.3***
IMR	?			−0.019	−2.62***	−0.011	−1.21
MOWN	?					0.0001	8.18***
IOWN	?					0.00007	4.79***
B4	−			−0.005	−3.47***	−0.005	−3.32***
Pseudo/ Adjusted R^2		0.15***		0.64***		0.65***	
n		11429		11429		8840	

, * Significant at the 0.05 and 0.01 levels (one-tailed where sign is predicted; two-tailed otherwise), respectively.

[a] Logistic regression of auditor choice model based on Francis et al. (1999), with *B4* as the dependent variable (= 1 for Big 4 auditor, 0 otherwise). The explanatory variables in the logistic regression are as follows: *SHORT* is the absolute value of short-term accruals in income, scaled by sales; *LONG* is the absolute value of long-term accruals in income, scaled by sales; *ln(SALES)* is the natural log of sales; *LEV* is the ratio of long-term liabilities to total assets; *P/E* is the price/earnings ratio; *ISSUE* (new equity issue) is 1 if change in equity > 10 percent, 0 otherwise; and, *LOSS* is 1 if current net income is < zero and absolute change in income > 10 percent, 0 otherwise.

[b] Regression with *ex ante* cost of equity capital (r_e) as the dependent variable. The control variables in the regression are as follows: *BETA* is stock beta (systematic risk); *ln(LEV)*is the natural log of financial leverage measured by the debt-to-asset ratio; *VAR* is earnings variability measured by the dispersion in analysts' forecasts of earnings; *ln(SIZE)* is natural log of size of the firm measured by the market value of common equity (in million of dollars); *ln(B/M)* is the natural log of ratio of book value of equity to market value of equity; *GRWTH* is forecasted growth measured as the difference between the mean analysts' two- and one-year ahead earnings forecasts scaled by the one-year ahead earnings forecast; *IMR* is the Inverse Mills ratio based on Heckman (1979) obtained from logistic regression of the auditor choice model; *MOWN* is managerial ownership measured as the percentage of the firm's equity shares held by individuals (officers, directors, and principal owners) with significant influence over corporate affairs (consistent with Warfield et al. 1995); and *IOWN* is institutional ownership measured as the percentage of the firm's equity shares held by institutions. The test variable *B4* is a dummy variable equal to 1 for a Big 4 audit, 0 otherwise.

For brevity, the year-specific and industry-specific intercepts are not reported.

in the corporate governance portfolio.[21] Specifically, based on previous research, we add variables *MOWN* (managerial ownership of equity) and *IOWN* (institutional ownership of equity) to our Model (1) as additional control variables. These additional variables are more completely defined in Table 5.[22]

Prior research (e.g., Warfield et al. 1995) suggests that managerial ownership of equity increases managers' incentives to take actions that are in the best interests of owners. Consequently, increased managerial ownership of equity is expected to lower the agency problems (specifically those relating to moral hazard situations) arising from the separation of ownership and control, and may be viewed as a potential corporate monitoring and governance substitute. Alternatively, increased managerial ownership could increase insiders' incentives to cheat minority shareholders and other investors out of most of the value of their investment through insider trading (Gul et al. 2002, 26).

Thus, from a financial reporting perspective, as managerial ownership increases managers may have a *greater* incentive to provide financial statements that have *less* integrity so that they can profit from their inside information. For this reason, in Table 5, we do not predict the sign of *MOWN* in the regression with the *ex ante* cost of equity capital as the dependent variable.

Prior research also suggests that more concentrated shareholdings by institutions provide an incentive for these large organizations to increase their monitoring of firms. Also, other things being equal, greater institutional holdings can be expected to facilitate activity in the market for corporate control (corporate takeovers) by lowering transaction costs and reducing the free-rider problem associated with small share holdings. In turn, the greater potential for corporate takeovers can be expected to increase managerial incentives to act in the best interests of stockholders. For these reasons, increased institutional ownership can be expected to mitigate agency problems, thereby lowering the cost of equity capital. However, as pointed out by Bushee and Noe (2000), (1) prior empirical research (Sias 1996; Potter 1992) suggests that higher levels of institutional ownership are associated with higher stock return volatility, and (2) higher stock return volatility can increase the perceived risk in a firm, thereby *increasing* the cost of equity capital (Froot et al. 1992). As an explanation for this counterintuitive empirical finding, Bushee and Noe (2000) suggest that institutional investors with short investment horizons can pursue aggressive trading strategies, and that aggressive trading by these transient institutions can exacerbate a firm's stock return volatility. In our study, the purpose of including *IOWN* as an explanatory variable is simply to control for institutional ownership as an alternative corporate governance mechanism. Consequently, in Table 5, we do not predict the sign of *IOWN* in the regression with the *ex ante* cost of equity capital as the dependent variable.

In Table 5, the last two columns present the regression results for Model (1) expanded to include variables *IMR* (to control for self-selection bias) and *MOWN* and *IOWN* (to control for alternative monitoring and corporate governance mechanisms). In this expanded model, the control variables *ln(LEV)*, *ln(SIZE)*, *B/M*, and *GRWTH* are significant with the predicted signs. In addition, variables *IMR*, *MOWN*, and *IOWN* are significant with a positive sign. As noted previously, a positive sign for IOWN may be counterintuitive but is consistent with prior empirical findings that increased institutional ownership may be

[21] Prior research also cites debt financing as a mechanism for reducing agency problems since debt can induce monitoring by lenders. The use of debt is captured in our regressions by the *LEV* (financial leverage) variable. The positive sign for *LEV* in the regressions (discussed previously) suggests that the risk effect of financial leverage dominates the monitoring benefits associated with debt financing.

[22] Data on variables *MOWN* and *IOWN* were obtained from Compact D-SEC.

associated with a higher cost of equity capital. Once again, *B4* is significant with a negative sign, indicating that Big 4 auditees in the U.S. have a lower *ex ante* cost of equity capital even after controlling for potential self-selection bias and the managerial and institutional ownership of equity as potential monitoring and corporate governance substitutes.[23]

V. CONCLUDING REMARKS

Prior research (e.g., DeAngelo 1981; Francis and Krishnan 1999) suggests that the large Big 4 accounting firms provide higher quality audits in the U.S. audit market in order to protect the firm's reputation and to avoid costly litigation. Since the U.S. has a high litigation risk environment, it is not possible to differentiate between the litigation exposure and the reputation protection explanations within the U.S. context. Hence, we attempt to differentiate between the two explanations in an international context.

Prior research (Jensen and Meckling 1976; Dopuch and Simunic 1982) also suggests that an independent audit is expected to add credibility to financial statements, and that higher perceived audit quality is associated with higher financial reporting credibility. In this study, we utilize the auditee-specific *ex ante* cost of equity capital as an observable proxy for financial reporting credibility, and examine whether Big 4 auditors significantly enhance the credibility of financial statements by focusing on the association between the *ex ante* cost of equity capital and a Big 4 (versus non-Big 4) audit in the U.S., Australia, Canada, and the U.K.

We include other Anglo-American countries in our study since prior research (Baginski et al. 2002; Seetharaman et al. 2002; Wingate 1997) suggests that the litigation risk facing auditors in these countries (Australia, Canada, and the U.K.) is substantially lower than in the U.S., and yet the financial reporting environment, the economic role of the audit, and other factors are similar to that of the U.S. In other words, we include these countries given their similar institutional details and economic environments but differing liability regimes. We investigate whether Big 4 auditors are perceived by investors as providing a higher quality audit (relative to non-Big 4 auditors) in the U.S. and in these less litigious environments. We neutralize the potential confounding effects of cross-border differences by investigating the perceived quality of Big 4 versus non-Big 4 audits within each country separately so that each country serves as its own control.

In the U.S., we find Big 4 auditees *ceteris paribus* to have a lower *ex ante* cost of equity capital than non-Big 4 auditees. By contrast, in Australia, Canada, and the U.K. we find no evidence to indicate that Big 4 auditees *ceteris paribus* have a lower *ex ante* cost of equity capital. The finding that Big 4 audits are perceived as higher quality audits only in the U.S. suggests that it is litigation exposure rather than reputation protection that drives perceived audit quality. The many similarities between the U.S., Australian, Canadian, and U.K. environments strengthens the internal validity of our analysis, particularly since we control for auditee-specific risk factors that are potentially associated with the cost of equity capital. Our findings are consistent with prior analytical research (e.g., Melumad and Thoman 1990) that suggests that audit quality is linked to litigation risk and the level of

[23] Separately, as noted by Bushee and Noe (2000, 173), corporate disclosure may be "a low-cost mechanism for monitoring corporate performance." In other words, in the context of our study, corporate disclosure may be yet another monitoring and corporate governance mechanism that could potentially substitute for a Big 4 audit. However, prior research (e.g., Lang and Lundholm 1996) indicates that the level of disclosure is increasing in firm size and decreasing in the dispersion in analysts' earnings forecasts. In our regressions, we do control for size and the dispersion in analysts' forecasts of earnings (variables *SIZE* and *VAR*, respectively). Hence, in the context of the regression results reported in Tables 3–5 and discussed previously, these control variables may (at least partially) also control for the level of corporate disclosure.

damages facing the auditor. Further, our findings are of potential interest to U.S. regulators since the implication is that a decrease in auditor litigation risk (as part of legal reform) could have unintended consequences for perceived audit quality in the U.S.

Potentially, our finding that a Big 4 audit is associated with a lower cost of equity capital for U.S. auditees (but not for auditees in the Australia, Canada, or the U.K.) is subject to the limitation that regression analysis tests for mere association rather than causation. Moreover, our findings should not be interpreted to mean that Big 4 audit quality in other Anglo-American countries is of lower quality than in the U.S. It may be that, in these other countries, investors perceive both Big 4 and non-Big 4 audits to be of similar high quality. As indicated by Levine and Zervos (1993) and Bushman and Smith (2001, 299), the results of cross-country studies (such as ours) should be interpreted as "suggestive" of underlying relationships and "there is much to learn from this type of inquiry."

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