Audit Pricing, Legal Liability Regimes, and Big 4 Premiums: Theory and Cross-country Evidence*

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1. Introduction

Starting with Simunic 1980, a number of studies have investigated cross-sectional determinants of audit fees using single-country samples from different countries. These studies have provided mixed evidence on the existence and magnitude of a fee premium associated with audits performed by Big 4 (previously Big 5, 6, or 8) audit firms, which we call a "Big 4 premium" in this paper. For example, Craswell, Francis, and Taylor (1995) and DeFond, Francis, and Wong (2000) find a Big 4 premium in Australia and Hong Kong, respectively. However, the evidence based on the U.K. and U.S. data is mixed. Using U.K. data, Chan, Ezzamel, and Gwilliam (1993), Pong and Whittington (1994), and Ireland and Lennox (2002) provide evidence consistent with the existence of a Big 4 premium, whereas Antle, Gordon, Narayanamoorthy, and Zhou (2006), Chaney, Jeter, and Shivakamar (2004), and Seetharaman, Gul, and Lynn (2002) fail to do so. For the U.S. audit market, Antle

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et al. (2006), Chaney, Jeter, and Shivakumar (2005), and Simunic (1980) document no evidence of the premium, whereas Francis and Simon (1987) and Higgs and Skantz (2006) find mixed evidence on the existence of a Big firm premium depending on the regression models or samples used.[1] In contrast, Ashbaugh, LaFond, and Mayhew (2003) report the existence of a significant premium. The mixed evidence on the existence and magnitude of a Big 4 premium across countries raises the following questions: Under what conditions do Big 4 auditors charge higher audit fees than non–Big 4 auditors? Why does previous research find a significant Big 4 premium in many countries, but mixed results for the United Kingdom or the United States? Are there any country-level, institutional factors that can explain the observed differences across countries? Our study seeks to shed light on these questions.

Because the existing audit fee studies are normally conducted in single-country settings,[2] they leave unresolved the question of what institutional factors drive cross-country variations in audit fees, and more specifically, how these factors influence the magnitude of the Big 4 premium. Given that legal liabilities associated with audit failures are an important factor that motivates auditors to expend effort in the performance of audits, a country's litigation environment is likely to play a crucial role in audit pricing. The main objectives of our study are to develop a theory and provide evidence on how the legal regime of a country affects audit pricing and the Big 4 premium, and how these pricing effects change as the legal regime shifts across countries.

To provide a conceptual framework for our empirical analysis, we first develop an auditor expected cost minimization model in which national legal environments play an important role in determining auditor effort and audit fees. On the basis of our model and analysis, we make the following predictions. First, audit fees increase monotonically with the strictness or strength of a country's legal liability regime. This occurs because, as the legal regime becomes stronger, the auditor is more likely to bear legal liability in case of an audit failure, which leads him or her to charge a higher audit fee to compensate for the increased expected legal liability costs. Second, given a legal liability regime, Big 4 auditors charge higher audit fees than non–Big 4 auditors. The reason underlying this prediction is as follows: because the potential legal liability cost is greater for a Big 4 auditor than for a non–Big 4 auditor, the Big 4 auditor has a greater incentive to increase audit effort than the non–Big 4 auditor. As a result, the Big 4 auditor charges a higher audit fee than the non–Big 4 auditor to compensate for the increased effort costs. Third, the Big 4 fee premium decreases as a country's legal regime shifts from a weak to a strong regime. The reason for this prediction is as follows: because a non–Big 4 auditor has a higher audit failure rate (that is, lower audit quality) than does a Big 4 auditor, the non–Big 4 auditor increases the audit fee more significantly than the Big 4 auditor to compensate for the larger increase in the expected legal liability costs (caused by the relatively higher audit failure rate), when the legal regime shifts from a weak to a strong regime. Thus, the fee spread between the two types of auditors becomes smaller as the legal regime becomes more onerous. (Note that our model also predicts that the effort spread between the two types of auditors also becomes smaller.) While the first two predictions concerning the behavior of audit

fees are intuitive and relatively straightforward, the benefit of our analytical model is that it also yields a third prediction — which is not so obvious — concerning the fee spread between Big and non–Big firms in different legal environments.

Before proceeding, we note that a concurrent paper by Francis and Wang 2008 also deals with the behavior of Big 4 versus non–Big 4 auditors in different legal and regulatory environments. Contrary to our prediction that the difference in audit fees (and auditor effort) between Big 4 and non–Big 4 firms becomes smaller as legal and regulatory regimes become more onerous, Francis and Wang (2008) argue that only audits by Big 4 auditors increase in quality under this condition. Basically, the authors argue that because non–Big 4 auditors have less to lose than Big 4 auditors, the quality of their audits will not change as legal and regulatory regimes become more onerous. To test this conjecture, Francis and Wang examine several measures of client earnings quality and find that the earnings quality of Big 4 clients increases in stricter legal and regulatory environments, while the earnings quality of non–Big 4 clients is largely unaffected. Because our paper and the Francis and Wang paper use different metrics to examine audit firm behavior (i.e., audit fees versus measures of client earnings quality), the distinctly different prediction of our paper versus that of Francis and Wang concerning the behavior of non–Big 4 firms around the world is not fully resolved and is an interesting topic for future research.

We test the predictions of our analytical model using a large sample of audit clients from 15 countries with different legal regimes where audit fee and auditor identity data are publicly available. The results of our cross-country regressions are consistent with our three hypotheses concerning the behavior of Big 4 versus non–Big 4 audit fees in different legal environments and are robust to a battery of sensitivity checks. We further find that the positive (negative) effects of the strength of a legal regime on audit fees (Big 4 premium) are more salient for small and medium-sized client companies than for large companies. This finding can be interpreted as being consistent with our theory that the fee premium is increasing as the difference between the legal liabilities of Big and non-Big auditors becomes larger. Because the non–Big 4 auditors of the large client companies are more likely to be large national (or even second-tier international) audit firms than those of the small client companies, the legal liability costs in case of litigation are likely to be similar for the Big 4 and such non–Big 4 audit firms, and thus the fee spread between Big 4 and non–Big 4 auditors becomes smaller and less significant (larger and more significant) for the large (small) client companies. In addition, in a supplementary test, our hypotheses with respect to auditor effort are all consistent with the pattern of auditor effort (measured by labor hours) observed in proprietary data sets from four countries whose legal regimes vary. Overall, our results indicate that a country's litigation environment is an important factor in determining auditor effort, audit fees, and the fee spread between Big 4 and non–Big 4 auditors.

This paper adds to the existing literature in the following ways. First, we systematically expand the scope of the extant audit fee research from a single-country setting into a cross-country setting, which allows us to examine the impact of a country's legal regime on audit pricing. Auditing textbooks and practice guidelines

often emphasize the importance of macroeconomic and institutional factors when assessing audit risks and designing substantive audit tests (e.g., Arens, Elder, and Beasley 2003). National legal environments are likely to influence clients' reporting incentives and auditors' assessments of audit risks, which in turn affect the auditors' effort choices and audit fees. However, previous research has paid little attention to investigating the role of country-specific institutional and/or macroeconomic factors in audit pricing. This paper provides evidence that a country's legal regime plays an important role in the behavior of auditors.

Second, we develop a model and offer a rigorous analysis of the effects of the strictness or strength of a country's legal liability regime on the two components of audit fees — namely, the expected legal liability cost and the auditor's effort cost — and therefore on the overall audit fee and the Big 4 fee premium. Our model is similar in spirit to previous studies in the literature, such as Dye 1993, 1995, Pae and Yoo 2001, and Liu and Simunic 2005, in the sense that the potential legal liability serves as a motivational device for auditors to exert effort in the performance of audits. However, we introduce into the model additional structure that allows us to explicitly investigate the effects of a legal regime on audit fees of the two classes of audit firms. A basic assumption of our model is that Big 4 auditors face a higher potential penalty (loss) from audit failure when auditing a given client than would a non–Big 4 auditor auditing that same client. This assumption is well established in the existing literature (e.g., Dye 1993; Simunic and Stein 1996) as a basis for differentiating between Big 4 and non–Big 4 firms. Among other things, our model analyzes the implications of this assumption, yields testable predictions concerning the relation between audit fees and a country's legal regime, and provides useful guidance for the empirical tests on the issue.

The remainder of the paper is organized as follows. In section 2, we develop an analytical audit fee model and formulate three hypotheses based on the model's predictions. In section 3, we specify our empirical model used for testing the hypotheses. In section 4, we explain our sample and data sources and provide descriptive statistics. In Section 5, we present the results of multivariate regressions using the full sample and a set of partitioned samples, and evaluate our hypotheses. In section 6, we conduct a battery of sensitivity tests to check whether our regression results are robust to alternative variable definitions, model specifications, econometric methods, and different sample partitioning, and also whether the behavior of auditor effort (from independently obtained proprietary samples) across countries is also consistent with our hypotheses with respect to auditor effort. The final section concludes the paper.

2. Audit fee model and hypothesis development

In this section, we develop a simple stylized model explaining how audit fees may be related to a country's legal liability regime, and then formulate our testable hypotheses based on the model's predictions.[3] We consider a single-period setting in which a client hires an auditor at the beginning of the period, and the auditor discharges his or her duty at the end of the period by issuing an audit report. When choosing audit effort, which determines audit quality, the auditor faces the trade-off

between the expected legal liability cost and the effort cost. Specifically, consider an owner who has a project that requires an upfront investment of $I > 0$. Assume that the project is either a good or bad type, which is unknown to the owner. A priori, the project is of a good type with probability $p \in (0, 1)$ and of a bad type with probability $(1 - p)$.[4] If operated, a good project generates a cash flow of R whereas a bad project yields zero return in the future. We assume that $pR > I$, so that the owner will operate the project without knowing the project's type, but will not operate the project if he or she knows that the project is a bad type. All parties in the model are risk neutral and have a zero discount rate for future cash flow.

The owner hires an auditor to attest to the type of the project. We assume that the more effort the auditor expends, the more likely that he or she will detect a bad project. Formally, let $a \in [0, 1]$ be audit effort, and let ka be the cost of audit effort, where $k > 0$. After conducting the audit, the auditor obtains a signal about the project's type. As is common in the literature (e.g., Dye 1995; Pae and Yoo 2001), the audit technology is characterized by the probability of the auditor's obtaining correct information about project type as follows:

$$\Pr[g|\text{Good}, a] = 1 \text{ and } \Pr[b|\text{Bad}, a] = a \quad (1),$$

where g and b, respectively, denote the auditor's signal that the project is of good type or bad type. In our paper, (1) indicates that the auditor will make no mistake in detecting a good project (i.e., there is no Type I error), but he or she may fail to detect a bad project depending on his or her audit effort (i.e., there may be a Type II error).[5] We assume that the auditor issues an audit opinion that is consistent with the signal he or she obtains, because in our single-period model, he or she has no incentive to misreport the signal.[6] Specifically, when the auditor obtains signal g, he or she will issue a "good" (unqualified) report. When the auditor obtains signal b, he or she will reveal the evidence and issue a "bad" (qualified) report.

Audit failure is the situation in which the project is of bad type, but the auditor issues a "good" report. We assume that, conditional on an audit failure, the probability of the auditor making a legal payment (i.e., damage award ordered by the court) to the client is $r(1 - a)$, where $r \in (0, 1]$ represents the strictness of a legal liability regime. We can interpret $r(1 - a)$ as the probability that, conditional on an audit failure, a court decides that the auditor is negligent and thus responsible for client damages from the audit failure. Observe here that the probability, $r(1 - a)$, is increasing in the strictness of a legal regime, r, and decreasing in the audit effort, a. This means that the stronger the legal liability regime is (and the less the audit effort), the more likely the audit failure will eventually lead to legal damages (i.e., the legal payment from the auditor to the client). Let the legal payment be denoted by $L > 0$.

Note that the client (owner) will not operate the project given a "bad" audit report (because there is no Type I error) and will operate the project given a "good" audit report (because $pR > I$ and the client may receive a legal payment from the auditor in case of an audit failure). We assume that there are two types of auditors, "Big" and "non-Big". Specifically, we assume that the legal liability cost for a Big

auditor is greater than that for a non-Big auditor. That is, $L_B > L_{NB}$, where the subscripts B and NB denote the Big and the non-Big auditors, respectively. This assumption captures the notion that the Big 4 (more prestigious) auditors have deeper pockets and greater reputation capital at stake and, thus, are more likely to end up with greater legal liability costs in case of an audit failure, compared with the non–Big 4 (less prestigious) auditors.[7]

Given the model structure, we consider the auditor's decision problem. For any given auditor, Big or non–Big, the decision problem is to choose a level of audit effort, a, in order to minimize his or her expected total audit cost, which is the sum of the expected legal liability cost and the effort cost associated with the audit engagement:

$$\underset{a \in [0,1]}{\text{Min}} \; (1-p)(1-a)[r(1-a)]L + ka \tag{2}$$

Note that in (2), $(1-p)$ is the probability of a bad project, $(1-a)$ is the probability of an audit failure (that is, failure to detect a bad project), and $[r(1-a)]$ is the probability of incurring a legal liability cost conditional on an audit failure. Hence, the first term in (2), $(1-p)(1-a)[r(1-a)]L$, represents the auditor's expected legal liability cost. Note also that the audit effort, a, reduces the expected liability cost by reducing both the probability of an audit failure and the probability of being found negligent and liable in court, conditional on an audit failure.

To ensure that the solution, denoted by a^*, is positive, we assume that $L > k/[2r(1-p)]$. The optimal level of audit effort (derived from the first-order condition) is:

$$a^* = \frac{2(1-p)rL - k}{2(1-p)rL} \tag{3}$$

Consistent with intuition, it is straightforward to see that the optimal effort, a^*, is increasing in the strictness of a legal regime and the legal liability payment ($\partial a^*/\partial r > 0$ and $\partial a^*/\partial L > 0$), and is decreasing in the marginal cost of audit effort ($\partial a^*/\partial k < 0$).

Assuming that the market for audit services is competitive so that the auditor gets a zero payoff in equilibrium,[8] we can express the equilibrium audit fee as follows:

$$f = (1-p)r(1-a^*)^2L + ka^* = \mu(a^*) + ka^* \tag{4}$$

where $\mu(a^*) \equiv (1-p)r(1-a^*)^2L$, which represents the expected legal liability cost at equilibrium. Viewing the audit fee as a function of the strictness of a legal regime, r, we can write audit fee as

$$\mathrm{f}(r) = (1-p)r(1-\mathrm{a}^*(r))^2L + ka^*(r) = k - \frac{k^2}{4(1-p)rL} \tag{5}$$

where the last equality holds from the substitution of (3) into (5). To examine how the shift in a legal regime influences the audit fee, we derive

$$\begin{aligned}\frac{\partial \mathrm{f}(r)}{\partial r} &= \frac{\partial \mathrm{f}(\mathrm{a}^*(r), r)}{\partial r} + \frac{\partial \mathrm{f}(\mathrm{a}^*(r), r)}{\partial a}\frac{\partial \mathrm{a}^*(r)}{\partial r} \\ &= \frac{\partial \mathrm{f}(\mathrm{a}^*(r), r)}{\partial r} \\ &= (1-p)(1-a^*)^2 L \\ &= \frac{k^2}{4(1-p)r^2 L} > 0 \qquad (6).\end{aligned}$$

In (6), the second equality holds because $\partial \mathrm{f}(\mathrm{a}^*(r), r)/\partial a = 0$. More specifically, a shift in the legal regime, *r,* affects the audit fee, *f*, in two different ways: (1) the shift in *r* directly affects *f*; and (2) the shift in *r* affects the audit effort, *a*, which in turn affects *f*. However, because *a* is chosen optimally, a small change in *a* has zero effect on *f*; hence the indirect effect becomes negligible, and only the direct effect remains.[9] This gives us an important result:

OBSERVATION 1. *The effect of a small shift in the legal regime, r, on the audit fee, f, depends only on* $(1-p)(1-a^*)^2 L$*, which is positive because* $a^* \in (0, 1)$.

Intuitively, this result means that the stricter is the legal regime (i.e., the greater is *r*), the more likely that an audit failure will lead to a legal payment made by the auditor to the client and, thus, the higher the audit fee will be. To provide empirical evidence on Observation 1, we test the following hypothesis in alternative form:

HYPOTHESIS 1. *Audit fees increase monotonically as a country's legal liability regime becomes stricter, other things being equal.*

We next examine how the audit fee differs between Big and non-Big auditors within a given legal regime. Let $q \equiv L_{NB}/L_B \in (0, 1)$, which denotes the ratio of the legal payment of a non-Big auditor to that of a Big auditor. Then, the difference in audit fees between the Big and non-Big auditors can be expressed as

$$\begin{aligned}f_B - f_{NB} &= [(1-p)r(1-a^*_B)^2 L_B + ka^*_B] - [(1-p)r(1-a^*_{NB})^2 L_{NB} + ka^*_{NB}] \\ &= \mu_B - \mu_{NB} + k(a^*_B + a^*_{NB}) \\ &= \frac{k^2(1-q)}{4(1-p)rqL_B} > 0 \qquad (7),\end{aligned}$$

which leads to the following observation.

OBSERVATION 2. *Given any legal regime characterized by* $r \in (0, 1]$*, the audit fee charged by a Big auditor is greater than that charged by a non-Big auditor — that is,* $f_B - f_{NB} > 0$.

The reasons for Observation 2 are as follows. As shown in (4), the audit fee has two components: the expected legal liability cost, represented by $\mu(a^*)$, and the audit effort cost, represented by ka^*. To understand how a change in L influences the audit fee — namely, f— let us examine how an increase in L (for example, from L_{NB} to L_B) affects the two audit fee components. On the one hand, as noted earlier, we have $\partial a^*/\partial L > 0$. This means that larger L induces greater audit effort, leading to a greater effort–cost component of audit fee, ka^*.

On the other hand, the effects of an increase in L on the expected legal liability cost, $\mu(a^*)$, are more complex. Recall that $\mu(a^*) = (1 - p)r(1 - a^*)^2L$. The first effect is straightforward: with effort being fixed, an increase in L leads to an increase in the expected legal liability cost, $\mu(a^*)$. The second effect is as follows: larger L induces greater audit effort, which in turn reduces the probability of audit failure, $(1 - a)$, and also reduces the probability of an auditor being found negligent in court, represented by $r(1 - a)$. As a result, an increase in L has a negative impact on $\mu(a^*)$. It can be shown that the second (negative) effect dominates the first (positive) effect ($\partial\mu/\partial L < 0$);[10] that is, the larger L reduces the expected legal liability cost through increased audit effort. However, because the second effect is mitigated by the first effect, the magnitude of the decrease in the expected legal liability cost due to an increase in L is less than the magnitude of the increase in the effort cost due to an increase in L. As a result, the net effect of an increase in L (e.g., from L_{NB} to L_B) is to raise the audit fee to a higher level, which explains why a Big auditor charges a higher fee, compared with a non-Big auditor: $f_B - f_{NB} > 0$.

In sum, within a legal regime, as the legal payment, L, becomes larger, the audit effort level becomes higher, which increases the effort–cost component of the audit fee and decreases the expected-liability-cost component. The net effect is a higher audit fee because the increase in audit effort costs exceeds the decrease in expected liability costs. We call the difference in the audit fees between the Big and non-Big auditors the Big auditor premium in audit pricing, and denote it by $\Delta f = f_B - f_{NB}$. To provide empirical evidence on Observation 2, we test the following hypothesis in alternative form:

HYPOTHESIS 2. *Given any legal regime, Big 4 auditors charge higher audit fees than non–Big 4 auditors, other things being equal.*

We now derive the owner's payoff and auditor choice in equilibrium. Assume that the owners are cash flow constrained in the sense that they carry a cost when paying the audit fee, which is characterized by θf^2 where $\theta > 0$ and differs across owners. Observe that the owner's payoff is $pR - I$ without an audit, and is $p(R - I) - (1 - p)(1 - a_i)I + (1 - p)r(1 - a_i)^2L_i - \theta f_i^2$ with an audit, where $i \in \{NB, B\}$.[11] Therefore, the owner's (incremental) payoff for purchasing an audit is $a_i(1 - p)I + (1 - p)r(1 - a_i)^2L_i - \theta f_i^2$.[12] Whether an owner gets a higher

payoff from a non-Big auditor than from a Big auditor depends on the magnitude of θ. Recall that θ characterizes the degree of cash flow constraint faced by different owners when paying audit fees. To illustrate, consider the following numerical example. Suppose that $p = 0.5$, $I = 6$, $r = 0.8$, $L_{NB} = 5$, $L_B = 6$, and $k = 2.5$. It is easy to show that the difference in the value of the audit provided by a non-Big auditor and that by a Big auditor is $0.465\theta - 0.182$, which is increasing in θ. This means that there exists a cutoff value of $\theta^* \approx 0.39$ above (below) which the owners would prefer a non-Big auditor (Big auditor) over a Big auditor (non-Big auditor). In other words, owners with high (low) cash flow constraint would get a better payoff from hiring a non-Big auditor (Big auditor) than a Big auditor (non-Big auditor). This is because owners with a high cash flow constraint find paying the Big auditor fee premium more costly than owners with a low cash flow constraint.

In the real world, the decision to purchase a Big versus a non-Big firm audit — say, by a publicly held company — may not typically be cash-flow-constrained, and other considerations may determine auditor choice. However, such a constraint can become important when a company faces a significant risk of bankruptcy. This is consistent with empirical evidence (e.g., Johnson and Lys 1990) that failing companies are more likely to switch from a Big to a non-Big audit firm.

We now examine how the Big auditor fee premium changes across different legal regimes, represented by different r's. As shown in Observation 1, the effect of a small shift in the legal regime, r, on the audit fee, f, depends only on $(1 - p)(1 - a^*)^2 L$. We therefore have

$$\begin{aligned}\frac{\partial(f_B - f_{NB})}{\partial r} &= (1-p)[(1-a_B^*)^2 L_B - (1-a_{NB}^*)^2(1-a_i)^2 L_{NB}] \\ &= (1-p)[(1-a_B^*)^2 L_B - (1-a_{NB}^*)^2(1-a_i)^2 q L_B] \\ &= (1-p)\left[\frac{k^2}{4(1-p)^2 r^2 L_B} - \frac{k^2}{4(1-p)^2 r^2 q L_B}\right] < 0 \qquad (8).\end{aligned}$$

This leads to the following observation:

OBSERVATION 3. *The Big auditor premium becomes smaller (larger) when the legal liability regime becomes stronger (weaker) — that is,* $\partial(f_B - f_{NB})/\partial r < 0$.

Observation 3 indicates that the spread in audit fees between Big 4 and non–Big 4 auditors — namely, the Big 4 premium — decreases as the legal regime shifts from a weak regime (e.g., Pakistan) to a stronger one (e.g., the United States). The intuition behind Observation 3 is as follows. In a given legal regime, a "deeper pocket" (i.e., a larger legal payment) leads Big auditors to exert a higher level of audit effort than non-Big auditors — namely, $a_B^* > a_{NB}^*$. As a result, the audit failure rate is relatively lower (or audit quality is relatively higher) for Big auditors than for non-Big auditors — namely, $(1 - a_B^*) < (1 - a_{NB}^*)$. Note that

the difference in audit failure rates between Big and non–Big firms is not an assumption of our model, but is simply a result of our assumption that $L_B > L_{NB}$.

Recall from Observation 1 that the effect of an increase in r on the audit fee is determined by $(1 - p)(1 - a^*)^2 L$. It follows that for a non-Big auditor, a shift to a stronger legal regime (i.e., an increase in r) leads to a large increase in the audit fee because the audit failure rate, $(1 - a^*_{NB})$, is high for the non-Big auditor, translating into a large increase in the expected legal liability cost. In contrast, for a Big auditor, a shift to a stronger legal regime gives rise to a relatively mild increase in audit fee because the audit failure rate, $(1 - a^*_B)$, is low for the Big auditor, translating into a relatively small increase in the expected legal liability cost.[13]

In sum, as r becomes larger, f_B increases less significantly, while f_{NB} increases more significantly in order to compensate for a relatively larger increase in expected legal liability costs due to the low audit quality (i.e., a high audit failure rate) of a non-Big auditor. As a result, the fee difference — namely, $\Delta f = f_B - f_{NB}$ — becomes smaller as the legal regime shifts from a weak to a strong regime. Conversely, as r becomes smaller, f_B decreases less significantly and f_{NB} decreases more significantly, hence the difference, Δf, becomes larger. This explains why the Big auditor fee premium becomes smaller (larger) as the legal regime becomes stronger (weaker) — that is, $\partial(f_B - f_{NB})/\partial r < 0$.[14] It is also interesting to observe that $\partial(a_B - a_{NB})/\partial r < 0$. That is, the difference in the audit effort (and thus the difference in audit quality) between Big and non-Big auditors is also decreasing as the legal regime becomes stronger. Consistent with this observation, Choi and Wong (2007) report that risky firms and/or debt- or equity-issuing firms in weak legal regime countries have a strong incentive to hire a Big auditor and that this incentive decreases as the legal regime becomes strengthened. This is because only Big auditors provide high-quality audit service in weak legal regime countries, whereas the quality of audit service between Big and non-Big auditors is not much different in strong legal regime countries, as demonstrated by $\partial(a_B - a_{NB})/\partial r < 0$. To provide empirical evidence for Observation 3, we test the following hypothesis in alternative form:

HYPOTHESIS 3. *The audit fee spread between Big 4 and non–Big 4 auditors — namely, the Big 4 fee premium — becomes smaller as the legal liability regime shifts from a weak regime to a strong regime, other things being equal.*

Figure 1 graphically illustrates the predictions of Hypotheses 1, 2, and 3. In Figure 1, the horizontal axis represents the legal regime and the vertical axis, the audit fee. As the legal regime shifts from a weak to a strong regime, the audit fees of both Big 4 and non–Big 4 auditors monotonically increase, as Hypothesis 1 predicts. In addition, as Hypothesis 2 predicts, given any legal regime, whether strong or weak, audit fees charged by Big 4 auditors are always greater than those charged by non–Big 4 auditors. Finally, as Hypothesis 3 predicts, the audit fee spread between Big 4 and non–Big 4 auditors is greater under a weak legal regime than under a strong legal regime.

3. Empirical model

To test our three hypotheses we posit the following regression model, which links audit fees with our test variables, firm-specific fee determinants, and country-level, macroeconomic variables:

$$\begin{aligned} AUDFEE_{ijt} = {} & \beta_0 + \beta_1 REGIME_i + \beta_2 BIG4_{ijt}{*}REGIME_i + \delta_1 LNTA_{ijt} \\ & + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} + \delta_4 ROA_{jt} + \delta_5 LEV_{ijt} \\ & + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} + \delta_9 CROSS_{ijt} \\ & + \delta_{10} INMR_{ijt} + \varphi_1 GDP_{it} + \varphi_2 FDI_{it} + \varphi_3 EQUITY_i \\ & + \varphi_4 DISCL_i + \varphi_5 B4DO_{it} + (Fixed\ Effect) + ErrorTerm \end{aligned} \quad (9),$$

where for country i:

$AUDFEE_{ijt}$ = the natural log of audit fee in thousands of U.S. dollars of firm j in year t;

$REGIME_i$ = the strictness of a country's legal regime, measured by the natural log of Wingate's 1997 litigation index for each country;

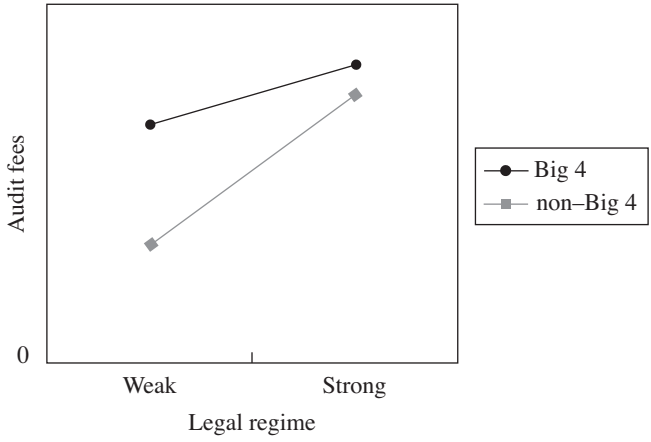
$BIG4_{ijt}$ = 1 when firm j uses one of the Big 4 (5, 6, or 8) auditors in year t, and 0 otherwise;

$LNTA_{ijt}$ = the natural log of year-end total assets in thousands of U.S. dollars of firm j in year t;

$INVREC_{ijt}$ = the sum of inventories and receivables divided by total assets of firm j in year t;

$LOSS_{ijt}$ = 1 when firm j reports a net loss in year t, and 0 otherwise;

Figure 1 Graphical illustration of Big 4 auditor fee premium across different legal regimes



ROA_{ijt} = the return on assets of firm j in year t;

LEV_{ijt} = the ratio of year-end total liabilities to total assets of firm j in year t;

$ISSUE_{ijt}$ = 1 when firm j has obtained long-term debt or equity financing by issuing bonds or new shares to outside capital suppliers in the three years prior to year t, and 0 otherwise;

NBS_{ijt} = the natural log of 1 plus the number of business segments of firm j in year t;

NGS_{ijt} = the natural log of 1 plus the number of geographical segments of firm j in year t;

$CROSS_{ijt}$ = 1 if firm j is cross-listed in foreign capital markets in year t, and 0 otherwise;

$INMR_{ijt}$ = the inverse Mills ratio for endogenous auditor choice of firm j in year t;

GDP_{it} = gross domestic product (GDP) per capita in thousands of U.S. dollars in year t;

FDI_{it} = foreign direct investment scaled by GDP in year t;

$EQUITY_i$ = the importance of each country's equity market, measured by the extent to which each country's firms rely on equity financing (the data are extracted from La Porta, Lopez-De-Silanes, Schleifer, and Vishney 1997 and Leuz, Nanda, and Wysocki 2003);

$DISCL_i$ = a country's disclosure level measured by the Center for International Financial Analysis and Research (CIFAR) index;

$B4DO_{it}$ = the Big 4 dominance in the country, measured by the difference between the market share of the smallest Big 4 auditor and that of the largest non–Big 4 auditor in year t.

We include in (9) three test variables, *REGIME*, *BIG4*, and *REGIME*BIG4*, to test our three hypotheses, Hypotheses 1, 2, and 3, respectively. First, the *REGIME* variable captures the strictness of a country's legal regime — r in our model — and is measured using Wingate's 1997 litigation index.[15] The Wingate litigation index is derived from an assessment of litigiousness for doing business as an auditor in each country and was developed by an international insurance underwriter for one of the Big 4 audit firms. The index was computed taking into account various institutional factors such as a country's legal, regulatory, political, and economic environments. The index ranges from 1 to 15 with the United States (Pakistan) taking the highest (lowest) value of 15 (1) among our sample countries. Several studies in the auditing literature have used this index to proxy for a country's litigation risk (e.g., Choi and Wong 2007; Chung, Firth, and Kim 2004). The coefficient on *REGIME* (i.e., β_1) captures the impact of a country's litigation environment on audit fees after controlling for all firm-specific fee determinants and all other

country-level variables included in (9). Hypothesis 1 is supported if the coefficient on *REGIME* is significantly positive (i.e., $\beta_1 > 0$). Second, we include the *BIG4* variable to empirically assess the magnitude of Big 4 fee premium — namely, $\Delta f = f_B - f_{NB}$. The coefficient on *BIG4* (i.e., β_2) captures the difference in audit fees between Big 4 and non–Big 4 auditors after controlling for all other firm-specific fee determinants and all country-level variables. A positive coefficient on *BIG4* is consistent with the existence of Big 4 premium, and Hypothesis 2 is thus supported if we observe $\beta_2 > 0$. Finally, the coefficient on *BIG4*REGIME* (i.e., β_3) captures how the Big 4 fee premium is differentially affected by *REGIME*. If the Big 4 fee premium is decreasing as the legal liability regime becomes stricter (i.e., $\partial \Delta f / \partial r < 0$), then β_3 should be negative. Hypothesis 3 is thus supported if we observe $\beta_3 < 0$.

In addition to the three test variables, we also include in (9) 10 firm-specific controls and 5 country-level controls that are likely to affect audit fees. As in other studies (e.g., Simunic 1980; Francis 1984; Choi and Wong 2007), we include *LNTA* and *INVREC* to proxy for client size and client complexity, respectively. Similar to other studies (e.g., Simunic 1980; Seetharaman et al. 2002), we include *LOSS*, *ROA*, and *LEV* to measure client-specific litigation risks to be borne by auditors. We also include *ISSUE* as an additional proxy for the client-specific risks because the expected liability cost arising from audit failure is likely to be greater for clients who have recently obtained external financing by issuing new equity shares or bonds in the capital markets. We include *NBS*, *NGS*, and *CROSS* as additional proxies for client complexity, because diversified, geographically dispersed, and/or cross-listed firms may require more audit effort/work (e.g., Simunic and Stein 1987), thus leading to higher audit fees. Because audit fees are positively related to client size, client complexity, and client-specific risk factors, we predict all coefficients on the firm-specific controls (i.e., δ_1 to δ_9) to be positive, except the coefficient on *ROA* (i.e., δ_4), which is expected to be negative. Following Chaney et al. 2004, we also include the inverse Mills ratio (*INMR*) in order to control for potential endogeneity problems associated with auditor choice.[16]

Considering the international scope of this study, we include five macro-economic variables — *GDP*, *FDI*, *EQUITY*, *DISCL*, and *B4DO* — to control for country-level factors that may cause variations in audit fees across countries. Note here that the *GDP*, *FDI*, and *B4DO* variables vary across countries and over years, while the *EQUITY* and *DISCL* variables vary only across countries. *GDP* is included to control for cross-country differences in living standards and thus the reservation compensation for audit partners and staff. *FDI* is included because audit fees may differ between countries with high and low foreign direct investment. La Porta et al. (1997) construct the *EQUITY* variable, taking into account three country-level factors: (a) the stock market capitalization held by noncontrolling shareholders relative to GDP; (b) the number of listed firms relative to the population; and (c) the number of initial public offerings relative to the population. The *EQUITY* variable measures the degree of equity market development or the extent to which firms in each country rely on equity financing relative to debt financing, which may differentially affect audit fees. Because there is no clear theory

on the relation between audit fees and the above three macroeconomic variables (*GDP*, *FDI*, and *EQUITY*), we do not predict the sign of their coefficients (φ_1, φ_2, and φ_3). *DISCL* is a measure of the level of required disclosures through financial statements in each country, developed by CIFAR. We include the *DISCL* variable to control for differences in the accounting rules and the complexity of reporting environment across our sample countries. A higher level of required disclosures may entail more auditor effort/work, suggesting a positive coefficient on *DISCL*. Finally, *B4DO* is a measure of Big 4 auditors' dominance and a proxy for the level of competition in the audit market of each country. We compute *B4DO* by taking the difference between the market share of the smallest Big 4 auditor in a country and that of the largest non–Big 4 auditor in the same country. If a country's audit market is dominated by Big 4 auditors, the monopoly power of the Big 4 auditors could allow them to charge higher fees. Thus, we expect a positive coefficient for this variable. Finally, we include in (9) the fixed effect dummies for industries and years to control for potential variations in audit fees across industries and over time.

4. Sample, data, and descriptive statistics

Our initial sample consists of all firms from countries where data on audit fees, auditor identity, and financial statement information are available from the 2004 Worldscope database. Our sample period covers the seven-year period from 1996 to 2002. After imposing the data requirement for computing empirical measures of firm-specific variables included in (9), we obtain a sample of 21,559 firm-year observations from 15 countries. The first column of Table 1 provides the number of firm-year observations for each country, which ranges from 55 for Pakistan to 6,756 for the United Kingdom. The U.S. sample has 3,722 firm-year observations, including 2,377 in 2002 and 1,345 for the rest of the sample period. The large number of U.S. observations available in 2002 reflects the fact that in November 2000, the Securities and Exchange Commission (SEC) issued Final Rule S7-13-00, *Revision of the Commission's Auditor Independence Requirements*, which requires all SEC registrants to disclose in their proxy statements filed on or after February 5, 2001, the amount of audit fees (as well as nonaudit fees) paid to their auditors.

We obtain data on each country's litigation risk index (*REGIME*) from Wingate 1997.[17] We extract data on gross domestic product (*GDP*) and foreign direct investment (*FDI*) in each sample year from International Financial Statistics published annually by the International Monetary Fund. We collect data on each country's equity market development index (*EQUITY*) from La Porta et al. 1997 and Leuz et al. 2003. We obtain the data required for computing Big 4 auditors' dominance in each country (*B4DO*) from the Worldscope database.

In Table 1, we present the mean values of all variables included in (9) for each sample country as well as the grand mean across all 15 countries in our sample. In addition, we partition our sample countries into two groups using Wingate's 1997 litigation index: (a) the strong legal-regime sample of countries with the Wingate index of no less than 10 (Australia, Hong Kong, New Zealand, United Kingdom, and United States); and (b) the weak legal-regime sample of countries with the Wingate index of less than 10 (Denmark, India, Ireland, Italy, Malaysia, Norway,

Pakistan, Singapore, South Africa, and Sweden).[18] We then conduct *t*-tests for mean differences between the two partitioned samples. The test results are reported in the last row of Table 1.

With respect to the results presented in Table 1, the following are noteworthy. First, our measure of audit fee (*AUDFEE*) is, on average, significantly higher in countries with strong legal regimes than in countries with weak legal regimes. Second, the grand mean of *BIG4* is 0.80. This means that 80 percent of the firms in the whole sample are audited by one of the Big 4 auditors. In the partitioned samples, the Big 4 auditors together audit 91 percent (75 percent) of all listed firms in the countries with strong (weak) legal regimes. Third, firms in countries with strong legal regimes are, on average, larger in size (*LNTA*), have less current assets as reflected in lower *INVEREC*, have more diversified and/or more geographically dispersed business operations, as reflected in larger *NBS* and *NGS*, and have higher client-specific litigation risk as reflected in *LOSS*, *ISSUE*, and *ROA*, compared with firms in countries with weak legal regimes. Note, however, that *CROSS* is greater, on average, in countries with weak legal regimes than in countries with strong legal regimes. This is consistent with the evidence that firms in countries with weak legal regimes are more likely to cross-list their equity shares on foreign exchanges than those with strong legal regimes (e.g., Doidge, Karolyi, and Stultz 2004). Lastly, countries with strong legal regimes have wealthier economies, more developed stock markets, higher level of required disclosure, and greater Big 4 auditors' dominance, as reflected in *GDP*, *EQUITY*, *DISCL*, and *B4DO*, respectively, compared with countries with weak legal regimes.

Table 2 presents Pearson correlation coefficients and *p*-values among all the explanatory variables included in our regression model, (9). The magnitudes of pair-wise correlations among firm-specific control variables are no greater than 0.4, except the correlations between *ROA* and *LOSS* (−0.63) and between *INMR* and *LNTA* (−0.68). The country-level variable, *REGIME*, is also highly correlated with *INMR* with the Pearson correlation coefficient of −0.58.[19] The five country-level control variables and *REGIME* are highly correlated with each other. To alleviate potential multicollinearity problems, we adjust *DISCL* and *B4DO* for the correlations with other country-level variables as follows: We regress each of these two variables on all other country-level variables and then use residuals obtained from these regressions for our analyses. As will be shown in the next section, we also repeat the analyses after excluding all five country-level control variables (*GDP*, *FDI*, *EQUITY*, *DISCL*, and *B4DO*). None of these reestimations qualitatively alters our regression results, suggesting that multicollinearity is not a serious problem in our regressions.

5. Regression results

Full-sample results

In columns (1) to (4) of Table 3, we report the ordinary least squares (OLS) estimates of regression coefficients of (9), along with their *t*-values in parentheses, using the full sample of firms that are pooled over years and across countries

TABLE 1
Sample characteristics*

Country	*n*	*AUDFEE* (mean)	*Wingate's Index*	*BIG4* (mean)	*LNTA* (mean)	*INVREC* (mean)	*LOSS* (mean)	*ROA* (mean)	*LEV* (mean)
Australia	913	5.18	10	0.90	11.64	0.19	0.28	−0.04	0.48
Denmark	697	4.92	4.82	0.69	12.45	0.29	0.12	0.03	0.67
Hong Kong	2,657	5.08	10	0.95	12.15	0.26	0.33	−0.02	0.44
India	885	2.81	2.42	0.25	11.42	0.38	0.20	0.04	0.59
Ireland	316	5.19	6.22	0.90	12.39	0.25	0.24	−0.02	0.64
Italy	59	4.71	6.22	0.98	12.72	0.37	0.14	0.05	0.55
Malaysia	2,199	3.57	3.61	0.85	11.69	0.30	0.32	−0.01	0.62
New Zealand	330	4.96	10	0.96	12.09	0.24	0.12	0.04	0.47
Norway	418	4.94	6.22	0.94	12.71	0.20	0.22	0.00	0.60
Pakistan	55	1.44	1	0.18	10.09	0.41	0.40	−0.02	0.75
Singapore	1,556	4.71	4.82	0.91	11.88	0.29	0.28	−0.01	0.47
South Africa	626	5.55	4.82	0.91	11.47	0.34	0.20	0.03	0.50
Sweden	370	5.86	4.82	0.88	12.53	0.29	0.37	−0.08	0.51
United Kingdom	6,756	5.43	10	0.87	12.10	0.27	0.24	−0.01	0.60
United States	3,722	6.37	15	0.87	13.19	0.21	0.34	−0.06	0.74
Mean† (total)	(21,559)	4.71	6.66	0.80	12.03	0.29	0.25	−0.01	0.58
Strong *REGIME* only	(14,378)	5.40	11.00	0.91	12.23	0.23	0.26	−0.02	0.55
Weak *REGIME* only	(7,181)	4.37	4.50	0.75	11.94	0.31	0.25	0.00	0.59
t-value for mean difference		52.63	256	3.50	15.29	−16.96	3.84	−9.70	−0.59

(The table is continued on the next page.)

TABLE 1 (Continued)

Country	*ISSUE* (mean)	*NBS* (mean)	*NGS* (mean)	*CROSS* (mean)	*INMR* (mean)	*GDP* (mean)	*FDI* (mean)	*EQUITY*	*DISCL*	*B4DO* (mean)
Australia	0.84	1.21	1.26	0.17	0.35	20.05	2.34	31.00	80	7.89
Denmark	0.74	1.37	1.22	0.04	0.47	32.33	5.66	26.33	75	4.88
Hong Kong	0.88	1.67	1.45	0.07	0.11	22.96	12.61	36.67	73	11.25
India	0.86	1.13	1.04	0.11	0.73	0.43	0.67	20.33	61	3.52
Ireland	0.86	1.54	1.67	0.84	0.30	22.81	12.06	24.00	81	4.11
Italy	0.68	1.03	1.32	0.54	0.49	19.42	0.71	10.00	66	13.50
Malaysia	0.78	2.79	1.50	0.21	0.36	4.06	3.54	33.00	79	−2.04
New Zealand	0.90	1.73	1.50	0.10	0.19	15.47	3.57	27.33	80	13.63
Norway	0.84	1.71	1.33	0.08	0.45	35.59	2.35	26.67	75	10.85
Pakistan	0.78	1.07	1.00	0.09	1.67	0.40	0.99	11.00	73	−3.64
Singapore	0.88	2.55	2.06	0.08	0.30	23.60	9.37	36.67	79	13.88
South Africa	0.50	1.26	1.11	0.14	0.40	2.94	1.68	21.67	79	13.66
Sweden	0.89	1.09	1.14	0.09	0.46	25.43	8.28	23.67	83	7.84
United Kingdom	0.84	1.56	1.55	0.06	0.19	22.66	4.01	32.67	85	11.89
United States	0.91	2.00	1.81	0.01	0.18	31.93	1.69	30.67	86	14.19
Mean (total)	0.81	1.58	1.40	0.18	0.44	18.67	4.64	26.11	77.00	8.36
Strong *REGIME* only	0.87	1.63	1.51	0.08	0.20	22.61	4.84	31.67	80.80	11.77
Weak *REGIME* only	0.78	1.55	1.34	0.22	0.56	16.70	4.53	23.33	75.10	6.66
t-value for mean difference	14.77	17.82	6.02	−26.26	−89.64	89.80	1.52	42.05	82.28	110

(The table is continued on the next page.)

TABLE 1 (Continued)

Notes:

* The sample consists of 21,559 firm-year observations from 15 countries.

† The mean is the grand mean (across countries) of country-level mean values, which is different from the mean of the total number of observations in the whole sample.

The variables are defined as follows:

AUDFEE = natural log of audit fee in thousands of U.S. dollars.

Wingate's Index = the Wingate litigation index (before taking the log).

BIG4 = 1 if the auditor of the firm is one of Big 4 auditors, and 0 otherwise.

LNTA = natural log of year-end total assets in thousands of U.S. dollars.

INVREC = the sum of inventory and receivables divided by total assets.

LOSS = 1 when the firm reports a net loss in the current year, and 0 otherwise.

ROA = return on assets. *LEV* = the firm's total liabilities over total assets.

ISSUE = 1 if the firm issued either equity or long-term debt for the past three years, and 0 otherwise.

NBS = natural log of 1 plus the number of business segments.

NGS = natural log of 1 plus the number of geographical segments.

CROSS = 1 when the firm is cross-listed in other countries, and 0 otherwise.

INMR = inverse mills ratio for endogenous auditor choice.

GDP = gross domestic product per capita in thousands of U.S. dollars.

FDI = foreign direct investment (scaled by total GDP) for the country.

EQUITY = the relative importance of equity market measured by the extent to which each country's firms depend on equity financing (the data are provided in La Porta et al. 1997 and Leuz et al. 2003).

DISCL = CIFAR index for the disclosure level.

B4DO = the Big 4 dominance in the country, measured by the difference between the market share of the smallest Big 4 auditor and that of the largest non–Big 4 auditor.

REGIME = the natural log of the Wingate litigation index.

TABLE 2
Correlations matrix (p-values in parentheses)

Variable	*AUDFEE*	*REGIME*	*BIG4*	*LNTA*	*INVREC*	*LOSS*	*ROA*	*LEV*	*ISSUE*
REGIME	0.4508								
	(<0.001)								
BIG4	0.2536	0.2118							
	(<0.001)	(<0.001)							
LNTA	0.5401	0.1736	0.2294						
	(<0.001)	(<0.001)	(<0.001)						
INVREC	−0.0051	−0.1547	−0.0476	−0.2317					
	(0.452)	(<0.001)	(<0.001)	(<0.001)					
LOSS	−0.0561	0.0362	−0.0693	−0.2970	−0.0405				
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)				
ROA	0.0438	−0.0866	0.0745	0.3089	0.0775	−0.6266			
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)			
LEV	0.1259	0.0043	−0.0719	0.0014	0.1336	0.1343	−0.2869		
	(<0.001)	(0.524)	(<0.001)	(0.840)	(<0.001)	(<0.001)	(<0.001)		
ISSUE	0.1725	0.1013	0.0315	0.1922	0.0084	0.0504	−0.0570	0.0922	
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.215)	(<0.001)	(<0.001)	(<0.001)	
NBS	0.1853	−0.0737	0.0570	0.1667	0.0994	−0.0004	0.0325	0.0340	0.0742
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.169)	(0.958)	(<0.001)	(<0.001)	(<0.001)
NGS	0.2799	0.0867	0.0781	0.1600	0.0078	0.0163	0.0016	0.0258	0.0896
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.250)	(0.016)	(0.811)	(<0.001)	(<0.001)

(The table is continued on the next page.)

TABLE 2 (Continued)

Variable	*AUDFEE*	*REGIME*	*BIG4*	*LNTA*	*INVREC*	*LOSS*	*ROA*	*LEV*	*ISSUE*
CROSS	0.0288	−0.1626	0.0089	0.0503	−0.0048	−0.0116	0.0122	−0.0063	0.0046
	(<0.001)	(<0.001)	(0.190)	(<0.001)	(0.482)	(0.090)	(0.072)	(0.351)	(0.499)
INMR	−0.4979	−0.5805	−0.3573	−0.6842	0.1192	0.1954	−0.2379	0.1444	−0.1175
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
GDP	0.4006	0.7590	0.1374	0.1811	−0.1534	0.0465	−0.1030	0.0526	0.1208
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
FDI	−0.0119	−0.0288	0.1076	0.0008	0.0088	−0.0089	0.0328	−0.0791	0.0242
	(0.079)	(<0.001)	(<0.001)	(0.910)	(0.194)	(0.194)	(<0.001)	(<0.001)	(<0.001)
EQUITY	0.0637	0.2745	0.2137	0.0292	−0.0190	0.0452	−0.0224	−0.0768	0.0675
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.005)	(<0.001)	(0.001)	(<0.001)	(<0.001)
DISCL	0.3598	0.6345	0.2261	0.1175	−0.1091	0.0252	−0.0712	0.0273	0.0334
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)
B4DO	0.4056	0.7400	0.0217	0.1267	−0.0863	0.0028	−0.0434	−0.0180	0.0680
	(<0.001)	(<0.001)	(0.001)	(<0.001)	(<0.001)	(0.683)	(<0.001)	(0.008)	(<0.001)

(The table is continued on the next page.)

TABLE 2 (Continued)

Variable	*NBS*	*NGS*	*CROSS*	*INMR*	*GDP*	*FDI*	*EQUITY*	*DISCL*
NGS	0.3831							
	(<0.001)							
CROSS	0.1011	0.0456						
	(<0.001)	(<0.001)						
INMR	−0.1162	−0.1567	0.0365					
	(<0.001)	(<0.001)	(<0.001)					
GDP	−0.0436	0.1125	−0.1593	−0.3500				
	(<0.001)	(<0.001)	(<0.001)	(<0.001)				
FDI	−0.0392	0.0047	0.0503	−0.2447	0.0185			
	(<0.001)	(0.493)	(<0.001)	(<0.001)	(0.007)			
EQUITY	0.1819	0.1266	−0.1105	−0.4973	0.2081	0.3525		
	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)		
DISCL	0.0474	0.1155	−0.0791	−0.3973	0.5078	−0.2466	0.2228	
	(<0.001)	(<0.001)	(0.038)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	
B4DO	−0.1040	0.0974	−0.2024	−0.0221	0.6901	0.0551	0.2188	0.4225
	(<0.001)	(<0.001)	(<0.001)	(0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)

Note:

Variables are as defined in Table 1.

(n = 21,559).[20] Similarly, in columns (5) to (8), we report the weighted least squares (WLS) estimates of regression coefficients of (9). In the WLS regression, we assign an equal weight to each country to alleviate potential problems that may arise from differences in sample size across our sample countries, especially a relatively large number of sample firms from the United Kingdom (n = 6,756) and the United States (n = 3,722).[21] As a sensitivity check, regressions in columns (1), (2), (5), and (6) exclude the country-level controls — namely, *GDP*, *FDI*, *EQUITY*, *DISCL*, and *B4DO* — while those in columns (3), (4), (7), and (8) include them. Note also that regressions in columns (1), (3), (5), and (7) exclude the interaction variable — namely, *BIG4*REGIME* — while those in Columns (2), (4), (6), and (8) include it. The regression results presented in Table 3 can be summarized as follows.

First, the coefficient on *REGIME* (β_1) is significantly positive at less than the 1 percent level throughout all columns, which supports Hypothesis 1. The significantly positive β_1 indicates that audit fees reflect the country-specific litigation risk associated with a country's legal regime in addition to client-specific risks proxied by *LOSS*, *ROA*, and *LEV*. More specifically, audit fees increase significantly as the legal regime shifts from a weak regime to a strong one. This is consistent with the view that the strength of a country's legal regime is a significant factor determining audit fees even after controlling for all other factors that are deemed to affect audit fees, including client-specific litigation risks.

Second, the coefficient on *BIG4* (i.e., β_2) is significantly positive at less than the 1 percent level throughout all columns. This is consistent with the existence of a significant Big 4 premium after all other fee determinants are controlled for. Consider the reduced model in column (1), which does not include the interaction variable. The coefficient on *BIG4* is 0.465 (t = 17.88) in this case. This translates into the Big 4 premium of 59.20 percent,[22] which is economically significant as well and is greater than the magnitude of the percentage of Big 4 premium reported in most previous studies using a single-country sample.[23] As explained in section 2, Big 4 auditors charge higher audit fees than non–Big 4 auditors because their greater legal payments in case of litigation ("deeper pockets") motivate them to work harder, thus increasing the effort–cost component of audit fees.

Third, the interaction variable, *BIG4*REGIME*, is highly significant in both columns (2) and (4). The coefficient on *BIG4*REGIME* (i.e., β_3) is −0.3189 (t = −7.88) and −0.2030 (t = −4.85) in columns (2) and (4), respectively, which is consistent with Hypothesis 3. The significantly negative β_3 indicates that as the legal liability regime shifts from a weak to a strong regime, audit fees charged by Big 4 auditors increase to a lesser extent, compared with those charged by non–Big 4 auditors, after controlling for all other firm-specific and country-level factors. As explained by our model and analysis in section 2, although the change in the legal regime may have multiple effects on the audit fee, the main reason for this result is as follows. Because the audit failure rate is higher (i.e., the audit quality is lower) for a non–Big 4 auditor, a shift from a weak to a strong legal regime causes the non–Big 4 auditor to raise the audit fee more significantly in order to compensate for the larger increase in the expected legal liability costs, compared

with the Big 4 auditor; consequently, the audit fee spread between the Big 4 and non–Big 4 auditors becomes smaller. Our finding of a significantly negative β_3 coefficient provides an explanation for why some previous studies have found that the Big 4 premium is relatively weak or insignificant in the U.S. audit market where litigation risk is relatively high, but it is significantly positive in non-U.S. markets where litigation risk is relatively low.[24]

Fourth, as reported in panel B of Table 3, the coefficients on all firm-specific control variables are highly significant with expected signs, except for the *ISSUE* variable.[25] That is, audit fees have a significantly positive relation not only with client size (*LNTA*) and client complexity (*INVERC*, *NBS*, *NGS*, and *CROSS*) but also with client-specific risks (*LEV* and *LOSS*). As expected, audit fees are significantly negatively related with the *ROA*, which is consistent with the notion that clients with high ROA have lower client-specific risk. The above relations are significant at less than the 1 percent level in most cases.[26]

Fifth, as reported in panel C of Table 3, the coefficients on country-level control variables, except *GDP*, are all highly significant throughout all columns, suggesting that international audit fee research like our study needs to control for country-wide, macroeconomic variables. In particular, we find that the coefficient on *GDP* is not significantly different from zero in the OLS regressions while it is significant in the WLS regressions.[27] Next, we find that the coefficient on *FDI* is significantly positive at less than the 1 percent level in the OLS regressions while it is significantly negative in the WLS regressions. Thus, the effect of these two variables on audit fees is mixed. In contrast, the coefficient on *EQUITY* is significantly negative throughout all columns, whereas the simple correlation between *EQUITY* and *AUDFEE* is positive (0.0637) as reported in Table 2. This suggests that, after controlling for all other factors affecting audit pricing, audit fees are higher (lower) in countries where debt (equity) is a more important source of external financing. Finally, the *DISCL* and *B4DO* variables have expected positive signs, suggesting that audit fees increase with the required disclosure level and the monopoly power of the Big 4 auditors.

Finally, as reported in panel A of Table 3, the coefficient on *BIG4*REGIME* is more significant when the WLS regression is used than when the OLS regression is used, although it is highly significant in both cases. Specifically, the *t*-value of this coefficient using the OLS regression is −7.88 and −4.85, respectively, as reported in columns (2) and (4), while the corresponding *t*-value using the WLS regression is −11.92 and −6.37, respectively, as reported in columns (6) and (8). The above results suggest that the use of OLS regressions introduces a conservative bias into the statistical significance of the variable. In what follows, to save space, we do not report the results of WLS regressions; we make our statistical inferences on the basis of the results of only OLS regressions.

Subsample results

The full-sample regression results presented in Table 3 implicitly assume that the underlying relations between the audit fee and its determinants other than *BIG4* do not differ significantly between countries with strong legal regimes and countries

TABLE 3
Results of multivariate regression of audit fee on its determinants (*t*-values in parentheses)

$$AUDFEE_{ijt} = \beta_0 + \beta_1 REGIME_i + \beta_2 BIG4_{ijt} + \beta_3 (BIG4_{ijt} * REGIME_i) + \delta_1 LNTA_{ijt} + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} + \delta_4 ROA_{jt} + \delta_5 LEV_{ijt} + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} + \delta_9 CROSS_{ijt} + \delta_{10} INMR_{ijt} + \varphi_1 GDP_{it} + \varphi_2 FDI_{it} + \varphi_3 EQUITY_i + \varphi_4 DISCL_i + \varphi_5 B4DO_{it} + (Fixed\ Effect) + ErrorTerm$$

	Ordinary least squares (OLS) regression				Weighted least squares (WLS) regression			
(0) Variable (pred. sign)	(1) Reduced model	(2) Reduced model	(3) Reduced model	(4) Full model	(5) Reduced model	(6) Reduced model	(7) Reduced model	(8) Full model
Panel A: Test variables								
REGIME (+)	1.6489	1.9129	1.7364	1.9322	1.2282	1.5855	0.8553	1.1150
	(69.30*)	(46.57*)	(42.66*)	(33.71*)	(45.55*)	(39.39*)	(23.27*)	(20.31*)
BIG4 (+)	0.4650	1.0751	0.3961	0.7885	0.4354	1.0652	0.2248	0.5782
	(17.88*)	(13.17*)	(15.53*)	(9.29*)	(16.46*)	(18.04*)	(8.68*)	(9.44*)
*BIG4**		−0.3189		−0.2030		−0.4232		−0.2330
REGIME (−)		(−7.88*)		(−4.85*)		(−11.92*)		(−6.37*)
Panel B: Firm-specific control variables								
LNTA (+)	0.5053	0.5225	0.5276	0.5404	0.3681	0.3917	0.2834	0.3089
	(76.82*)	(75.48*)	(58.18*)	(57.25*)	(55.70*)	(56.95*)	(33.22*)	(32.81*)
INVREC (+)	1.4549	1.4950	1.4563	1.4813	0.9175	0.9216	0.8139	0.8328
	(35.62*)	(36.37*)	(35.78*)	(36.13*)	(21.77*)	(21.93*)	(19.53*)	(19.95*)

(The table is continued on the next page.)

TABLE 3 (Continued)

	Ordinary least squares (OLS) regression				Weighted least squares (WLS) regression			
(0) Variable (pred. sign)	(1) Reduced model	(2) Reduced model	(3) Reduced model	(4) Full model	(5) Reduced model	(6) Reduced model	(7) Reduced model	(8) Full model
Panel B (Continued)								
LOSS (+)	0.2184	0.2264	0.2492	0.2543	0.0693	0.0858	0.0564	0.0647
	(8.75*)	(9.08*)	(10.25*)	(10.46*)	(2.59*)	(3.21*)	(2.19†)	(2.51†)
ROA (−)	−0.2495	−0.2365	−0.2363	−0.2303	−0.7184	−0.6669	−0.6246	−0.6016
	(−4.55*)	(−4.32*)	(−4.42*)	(−4.31*)	(−11.55*)	(−10.73*)	(−10.41*)	(−10.02*)
LEV (+)	0.2301	0.2115	0.2250	0.2137	0.0628	0.0356	0.1103	0.0921
	(10.16*)	(9.30*)	(10.07*)	(9.52*)	(2.34†)	(1.32)	(4.26*)	(3.54*)
ISSUE (+)	0.0003	0.0003	0.0312	0.0296	−0.0942	−0.0982	0.0041	−0.0060
	(0.01)	(0.01)	(1.29)	(1.23)	(−3.94*)	(−4.12*)	(0.17)	(−0.25)
NBS (+)	0.1026	0.0991	0.1268	0.1257	0.0795	0.0776	0.0930	0.0906
	(15.11*)	(14.58*)	(18.64*)	(18.47*)	(9.82*)	(9.62*)	(11.48*)	(11.19*)
NGS (+)	0.2049	0.2067	0.1840	0.1858	0.1634	0.1680	0.1437	0.1453
	(24.99*)	(25.23*)	(22.93*)	(23.14*)	(16.56*)	(17.07*)	(15.04*)	(15.21*)
CROSS (+)	0.3450	0.3329	0.3408	0.3329	0.2322	0.2202	0.2642	0.2612
	(11.37*)	(10.97*)	(11.32*)	(11.05*)	(9.65*)	(9.17*)	(10.50*)	(10.39*)
INMR (?)	1.7021	1.8807	2.0300	2.1710	0.0498	0.3400	−0.8994	−0.6088
	(22.16*)	(23.52*)	(16.68*)	(17.36*)	(0.95)	(5.91*)	(−11.19*)	(−6.59*)

(The table is continued on the next page.)

TABLE 3 (Continued)

(0) Variable (pred. sign)	Ordinary least squares (OLS) regression (1) Reduced model	(2) Reduced model	(3) Reduced model	(4) Full model	Weighted least squares (WLS) regression (5) Reduced model	(6) Reduced model	(7) Reduced model	(8) Full model
Panel C: Country-level control variables								
GDP (?)			0.0011	−0.0003			0.0253	0.0227
			(0.78)	(−0.23)			(21.63*)	(18.31*)
FDI (?)			0.0242	0.0249			−0.0077	−0.0054
			(14.16*)	(14.56*)			(−4.22*)	(−2.91*)
EQUITY (?)			−0.0139	−0.0142			−0.0186	−0.0161
			(−5.47*)	(−5.59*)			(−9.54*)	(−8.09*)
DISCL (+)			2.9070	2.7179			3.8996	3.8509
			(19.82*)	(17.92*)			(32.37*)	(31.93*)
B4DO (+)			0.0658	0.0662			0.0620	0.0616
			(24.63*)	(24.80*)			(25.57*)	(25.42*)
Intercept	−6.3885	−7.1353	−6.6317	−7.1616	−2.8395	−3.7230	−0.6609	−1.4869
	(−49.21*)	(−44.44*)	(−27.29*)	(−26.89*)	(−21.83*)	(−24.93*)	(−3.20*)	(−6.11*)
Fixed-effect dummies	Included	Included	Included	Included	Included	Included	Included	Included
Adj. R^2	0.5166	0.5180	0.5426	0.5431	0.5044	0.5076	0.5423	0.5432
n	21,559	21,559	21,559	21,559	21,559	21,559	21,559	21,559

(The table is continued on the next page.)

TABLE 3 (Continued)

Notes:

Variables are as defined in Table 1.

* Significant at the 0.01 level (one-tailed where signs are predicted, two-tailed otherwise).

with weak legal regimes. However, the results of our univariate tests for mean differences between the strong *REGIME* and weak *REGIME* samples, as reported in the lower part of Table 1, show that all explanatory variables included in (9), except *LEV* and *FDI*, differ significantly between the two distinct samples. This suggests that the effects of firm-specific explanatory variables on audit fees, captured by regression coefficients, may differ systematically between the strong *REGIME* and weak *REGIME* countries. Furthermore, the relations could vary from country to country, because the descriptive statistics in Table 1 reveal that sample characteristics are not the same across countries. To address this issue, we also estimate the regression in (10) for each country.

$$\begin{aligned} AUDFEE_{ijt} = {} & \beta_0 + \beta_1 BIG4_{ijt} + \delta_1 LNTA_{ijt} + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} \\ & + \delta_4 ROA_{jt} + \delta_5 LEV_{ijt} + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} \\ & + \delta_9 CROSS_{ijt} + \delta_{10} INMR_{ijt} + (Fixed\ Effect) + ErrorTerm \end{aligned} \quad (10).$$

Note that (10) is similar to (9), except that (10) does not include the five country-level control variables as well as *REGIME* and *REGIME*BIG4*, because (10) will be estimated for each country, and these variables have no within-country variation. Though not tabulated, we can report that the significance and the sign of regression coefficients estimated from country-by-country regressions are overall consistent with those reported in Table 3, suggesting that firm-specific determinants included in our regressions are significant and robust across different countries.

In addition, we partition the full sample into two subsamples using the Wingate litigation index of 10 as a cutoff value: (a) the strong *REGIME* sample (i.e., countries with the Wingate index greater than or equal to 10); and (b) the weak *REGIME* sample (i.e., countries with the Wingate index less than 10).[28] The results of country-by-country regressions reveal that, among five countries in the strong *REGIME* sample, only one country shows a significantly positive sign for the coefficient on *BIG4*, and the average of the *BIG4* coefficient across these five countries is 0.0982. In contrast, 5 out of 10 countries in the weak *REGIME* sample show a significantly positive coefficient on *BIG4*, and the average of the *BIG4* coefficient across these 10 countries is 0.3206 (which is more than three times greater than that for countries in the weak *REGIME* sample). In short, the above results of country-by-country regressions confirm the finding of our cross-country, pooled regressions (reported in Table 3) that Big 4 premiums are greater and more pronounced in countries with weak legal regimes than in countries with strong legal regimes.[29]

For a parsimonious presentation, we estimate pooled regressions separately for the strong *REGIME* sample and for the weak *REGIME* sample, rather than presenting the results for each of 15 countries. Columns (1) and (2) of Table 4 present the results of regressions separately for each partitioned sample, and column (3) reports the results of tests for differences in regression coefficients between the two samples.

As shown in panel A of Table 4, the coefficient on *BIG4* (β_1) is significantly positive in both samples, and it is significantly smaller for the strong *REGIME* sample ($\beta_1 = 0.2884$) than for the weak *REGIME* sample ($\beta_1 = 0.6812$) after all other variables are controlled for. This difference in β_1 is significant at less than the 1 percent level ($t = -7.20$). This means that the Big 4 premium is significantly smaller in countries with high litigation risk than in countries with low litigation risk. This finding is consistent with the significantly negative coefficient on *BIG4*REGIME* in Table 3.

With respect to regression coefficients on firm-specific control variables, the following are noteworthy. First, as shown in panel B of Table 4, the marginal effect on the audit fee of client size (proxied by *LNTA*), client complexity (proxied by *INVREC* and *NBS*), client-specific risk (proxied by *LOSS*, *LEV*, *ROA*, and *ISSUE*), and inverse Mills ratio (*INMR*) are significantly greater for the strong *REGIME* sample than for the weak *REGIME* sample. However, the coefficient on *CROSS* is smaller for the strong *REGIME* sample than for the weak *REGIME* sample. There is no significant difference in the coefficient on *NGS*. Overall, the above results suggest that the audit fee structure differs between countries with strong legal regimes and those with weak legal regimes.[30]

The effect of client size

Using U.S. data, Simunic (1980) finds no significant fee premium associated with the then Big 8 auditors for large clients, while Francis and Simon (1987) and Ward, Elder, and Kattelus (1994) find the fee premium only in the small client segment. Using Australian and Canadian data, Francis and Stokes (1986) and Anderson and Zeghal (1994), respectively, find evidence of the Big 4 premium only for the small client segment. However, these single-country studies use different audit fee models and data from different time periods and countries, which makes it difficult to compare the results among them.

To provide further evidence on the effect of client size on the Big 4 premium in a cross-country setting using the same audit fee model and the same data set, we rank all firms in each year on the basis of firm size (measured by *LNTA*) and construct three client-size-based subsamples; that is, the small, medium, and large client strata that consist of firms with the smallest 30 percent, the middle 40 percent, and the largest 30 percent of our sample firms, respectively. We then estimate (9) separately for each size stratum and report the results in Table 5.

With respect to the regression result for each size stratum, the following are noteworthy. First, as shown in panel A of Table 5, the coefficient on *REGIME* (i.e., β_1) is highly significant across all three size strata, which buttresses the support for Hypothesis 1. We observe that the magnitude and significance of the β_1 coefficient is the highest (lowest) for the small-client (large-client) stratum. This suggests that

TABLE 4
Tests for coefficient differences between high and low litigation-risk countries
(t-values in parentheses)

$$AUDFEE_{ijt} = \beta_0 + \beta_1 BIG4_{ijt} + \delta_1 LNTA_{ijt} + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} + \delta_4 ROA_{jt} + \delta_5 LEV_{ijt} + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} + \delta_9 CROSS_{ijt} + \delta_{10} INMR_{ijt} + (Fixed\ Effect) + ErrorTerm$$

	Sample partition by Wingate litigation index (*REGIME*)		
Variable (predicted sign)	(1) Strong *REGIME*	(2) Weak *REGIME*	(3) Differences = (1) − (2)
Panel A: Test variable			
BIG4 (+)	0.2884	0.6812	−0.3928
	(8.10*)	(16.08*)	(−7.20*)
Panel B: Firm-specific control variables			
LNTA (+)	0.6516	0.2805	0.3711
	(64.25*)	(20.28*)	(22.04*)
INVREC (+)	1.8173	0.4692	1.3481
	(34.79*)	(6.17*)	(14.92*)
LOSS (+)	0.4236	−0.0667	0.4903
	(13.59*)	(−1.47)	(9.08*)
ROA (−)	−0.2241	−0.6025	0.3784
	(−3.52*)	(−4.85*)	(2.78*)
LEV (+)	0.2968	0.0887	0.2081
	(10.62*)	(1.94†)	(3.98*)
ISSUE (+)	0.1795	−0.1900	0.3696
	(5.53*)	(−4.62*)	(7.17*)
NBS (+)	0.1107	0.0123	0.0984
	(12.26*)	(1.08)	(6.87*)
NGS (+)	0.2048	0.2219	−0.0171
	(20.77*)	(13.86*)	(−0.93)
CROSS (+)	0.0624	0.3921	−0.3298
	(1.35)	(9.00*)	(−5.23*)
INMR (?)	3.2232	−0.6588	3.8820
	(21.47*)	(−6.12*)	(20.99*)
Intercept	−4.7160	0.2661	−4.9820
	(−31.58*)	(1.23)	(−19.32*)
Fixed-effect dummies	Included	Included	
Adj. R^2	0.4886	0.2729	
n	14,378	7,181	

(The table is continued on the next page.)

TABLE 4 (Continued)

Notes:

Variables are as defined in Table 1. The high *REGIME* sample includes countries where the Wingate litigation index is greater than or equal to 10. (Australia, Hong Kong, New Zealand, the United Kingdom, and the United States belong to this category.) The low *REGIME* sample includes countries where the Wingate litigation index is less than 10. (Denmark, India, Ireland, Italy, Malaysia, Norway, Pakistan, Singapore, South Africa, and Sweden belong to this category.) Though not reported, we also repeat the analysis using the cut-off value of 7 instead of 10, and the results using the alternative cutoff value are qualitatively similar to those reported in the above table.

* Significant at the 0.01 level (one-tailed where signs are predicted, two-tailed otherwise).

the fee-increasing effect of country-level litigation risk is more pronounced for the small-client segment than for the large-client segment. Second, the coefficient on *BIG4*, which captures the magnitude of Big 4 premium, is significantly positive for small and medium-size strata at less than the 1 percent level, but it is not significantly different from zero for the large-size stratum. In other words, the Big 4 premium exists only for small and medium-size client segments. This finding at least partially explains why some previous research found the existence of a Big 4 premium only for the small size client segment (e.g., Francis and Stokes 1986). Finally, the coefficient on the interaction variable, *BIG4*REGIME*, is significantly negative for small and medium-size strata, but not significant for large client companies.

The insignificant Big 4 premium for large client companies is consistent with our theory. To the extent that the non-Big auditors of the large client companies are more likely to be large national (or even second-tier international) audit firms than those of the small client companies, the legal liability cost in case of litigation would be similar for the Big and such non-Big firms — that is, $q \equiv L_{NB}/L_B \to 1$. In this case, the Big auditor fee premium tends to disappear.[31] In the context of our model in (7), this can be shown as follows:

$$\lim_{q \to 1} (f_B - f_{NB}) = \lim_{q \to 1} \frac{k^2(1-q)}{4(1-p)rqL_B} = 0.$$

In contrast, to the extent that the non-Big auditors of the small client companies tend to be relatively small with less wealth/reputation capital at stake, the difference in the legal liability costs of Big and such non-Big auditors would be large. In such a case, the fee spread between Big and such non-Big auditors is likely to be more pronounced. Mathematically, it is straightforward to show that the fee premium ($\Delta f = f_B - f_{NB}$) is increasing as the difference between the legal liabilities of the Big and the non-Big auditors becomes greater. As such, the insignificant coefficient on *BIG4* only for the large client segment that we observe in Table 5 is consistent with the implication of our theory.[32]

TABLE 5
Regression results for three client-size based samples (*t*-values in parentheses)

$$AUDFEE_{ijt} = \beta_0 + \beta_1 REGIME_i + \beta_2 BIG4_{ijt} + \beta_3 (BIG4_{ijt} * REGIME_i) + \delta_1 LNTA_{ijt} + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} + \delta_4 ROA_{ijt} + \delta_5 LEV_{ijt} + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} + \delta_9 CROSS_{ijt} + \delta_{10} INMR_{ijt} + \varphi_1 GDP_{it} + \varphi_2 FDI_{it} + \varphi_3 EQUITY_i + \varphi_4 DISCL_i + \varphi_5 B4DO_{it} + (Fixed\ Effect) + ErrorTerm$$

Variable (predicted sign)	Size-based strata: Small client sample (smallest 30%)	Medium client sample (middle 40%)	Large client sample (largest 30%)
Panel A: Test variables			
REGIME (+)	2.1402	1.6211	1.6060
	(21.05*)	(13.55*)	(12.17*)
BIG4 (+)	1.2225	0.6763	0.1452
	(7.32*)	(5.64*)	(0.87)
BIG4**REGIME* (−)	−0.3895	−0.1431	0.1133
	(−4.85*)	(−2.41†)	(1.32)
Panel B: Firm-specific control variables			
LNTA (+)	0.5430	0.4209	0.5024
	(38.15*)	(14.76*)	(20.05*)
INVREC (+)	1.4163	1.3641	1.4645
	(17.04*)	(21.91*)	(19.09*)
LOSS (+)	0.2894	0.1968	0.2457
	(6.10*)	(5.65*)	(5.11*)
ROA (−)	0.4300	−0.1001	0.1060
	(−5.07*)	(−1.20)	(0.80)
LEV (+)	0.0574	0.3526	0.6123
	(1.77‡)	(8.46*)	(10.72*)
ISSUE (+)	−0.0975	0.0837	0.1931
	(−2.14†)	(2.35†)	(3.84*)
NBS (+)	0.1290	0.1214	0.1058
	(10.47*)	(11.13*)	(8.62*)
NGS (+)	0.1649	0.1853	0.1913
	(11.19*)	(14.42*)	(13.44*)
CROSS (+)	0.3377	0.3058	0.3123
	(6.10*)	(6.70*)	(5.44*)
INMR (?)	1.8388	1.5455	2.2751
	(9.68*)	(4.67*)	(6.27*)

(The table is continued on the next page.)

TABLE 5 (Continued)

Variable (predicted sign)	Size-based strata: Small client sample (smallest 30%)	Medium client sample (middle 40%)	Large client sample (largest 30%)
Panel C: Country-level control variables			
GDP (?)	−0.0039	0.0030	0.0037
	(−1.40)	(1.07)	(1.24)
FDI (?)	0.0237	0.0223	0.0255
	(6.86*)	(7.90*)	(7.37*)
EQUITY (?)	−0.0231	−0.0121	−0.0162
	(−4.83*)	(−2.45†)	(−3.12*)
DISCL (+)	3.0372	1.9321	3.2810
	(10.01*)	(8.69*)	(11.33*)
B4DO (+)	0.0632	0.0639	0.0726
	(11.30*)	(17.32*)	(14.43*)
Intercept	−6.8696	−5.1930	−6.4278
	(−15.66*)	(−7.26*)	(−9.48*)
Fixed-effect dummies	Included	Included	Included
Adj. R^2	0.6540	0.3759	0.4826

Notes:

Variables are as defined in Table 1. The small client sample consists of the smallest 30 percent of firms in terms of the magnitude of *LNTA*. The large client sample consists of the largest 30 percent of firms. The medium client sample consists of all other medium-size firms that fall in the middle 40 percent of firms.

* Significant at the 0.01 level (one-tailed where signs are predicted, two-tailed otherwise).

† Significant at the 0.05 level (one-tailed where signs are predicted, two-tailed otherwise).

‡ Significant at the 0.10 level (one-tailed where signs are predicted, two-tailed otherwise).

In short, the results reported in Table 5 suggest that our regression results reported in Table 3 in support of Hypotheses 2 and 3 are more pronounced for the small and medium-size client segments than for the large client segment, which is consistent with the findings of previous single-country research (e.g., Francis and Stokes 1986; Carson, Farher, Simon, and Taylor 2004).[33]

6. Sensitivity tests

Alternative regression results

In this section, we conduct a variety of sensitivity tests to check whether our regression results are robust to alternative variable definitions, econometric methods and model specifications, and different sample partitioning approaches. Table 6 reports the results of various regressions used for the sensitivity tests.[34] In column (1) of the table, we show the OLS regression result for the full model presented in column (4) of Table 3, which will be used as the benchmark for our sensitivity checks. In what follows, we compare the benchmark result in column (1) with alternative regression results reported in columns (2) to (6) of the table.

First, we estimate (9) using the legal enforcement index of La Porta et al. 1997 (instead of the Wingate litigation index) as an alternative proxy for a country's legal liability regime.[35] Column (2) of Table 6 reports the OLS estimates of regression coefficients along with their *t*-values. A comparison between the results reported in columns (1) and (2) reveals that the use of the legal enforcement index does not alter our earlier results using the Wingate litigation index. As shown in panel A of the table, the coefficients for our test variables — namely, *REGIME*, *BIG4*, and *BIG4*REGIME* — remain highly significant with the expected signs, suggesting that our earlier inferences on hypothesis testing are robust to alternative proxies for a country's legal liability regime. In addition, the coefficients on the firm-specific and country-level control variables remain qualitatively similar to our earlier results.

Second, our analyses so far implicitly assume a one-way causation between audit fee (*AUDFEE*) and a country's legal liability regime (*REGIME*). It is possible, however, that both are simultaneously determined. Suppose, for example, that those auditors who charge higher audit fees (e.g., Big 4 auditors) are subject to a higher expected legal liability.[36] In such a case, *AUDFEE* may have a positive effect on *REGIME*. To address this potential endogeneity problem, we first predict *REGIME* using a country's *GDP* and legal origin as instrumental variables, and then estimate (9) using the predicted value of *REGIME*. Following Leuz et al. 2003 and Choi and Wong (2007), we choose these two instrumental variables, because a country's wealth and legal origin are likely to influence a country's litigation environment. Column (3) of Table 6 reports the OLS estimates of regression coefficients and their *t*-values using this instrumental variable approach. Note that the result in column (3) is qualitatively identical to our benchmark result reported in column (1), indicating that our regression results are robust to this potential endogeneity problem.

Third, we estimate (9) for each of our seven sample years, 1996–2002, using the Fama-MacBeth regression procedure, to check whether our OLS regression results are driven by residual cross-correlations. In column (4) of Table 6, we report the average value of seven annual coefficients for each explanatory variable, along with the associated *t*-value. The *t*-value (in parenthesis) for each coefficient represents the average coefficient divided by the standard error of the seven annual coefficients (and then multiplied by the square root of 7 minus 1). A comparison of the results in columns (1) and (4) shows that they are qualitatively similar, suggesting that our regression results are not driven by residual cross-correlations.[37]

Fourth, we check whether our regression results are influenced by cross-country differences in the structure of the auditing industry. In the United States, for example, there are relatively large non–Big 4 auditors, such as BDO Seidman and Grant Thornton, that may be capable of providing high-quality audit services comparable to those provided by Big 4 auditors. In such a case, the use of this simple Big 4/non–Big 4 dichotomy could potentially lead to an erroneous inference on audit quality differentiation between Big 4 and non–Big 4 auditors. To check the sensitivity of our results to this potential classification error, we identify all non–Big 4 auditors that have at least 3 percent of the total market share in each country.[38] Using this cutoff criterion, we identify seven non–Big 4 auditors in six countries (a total of 807 firm-year observations) in our total sample. In column (5), we report the OLS regression result for (9) using this new sample, which excludes these 807 firm-year observations. The results reported in columns (1) and (5) are qualitatively similar, suggesting that our regression results are robust to alternative Big 4/non–Big 4 classifications.[39]

Finally, we perform a median quantile regression as well as a robust regression in order to minimize the influence of extreme observations. The coefficient estimates from these two regressions are qualitatively similar to each other and are consistent with the OLS estimates reported in column (1). For brevity, we report only the result of median quantile regression in column (6). A comparison of the results reported in columns (1) and (6) reveals that our regression results are not driven by the existence of outliers.

Evidence from auditor effort data

As noted in section 2, our analytical model also predicts the behavior of auditor effort as the litigation regime becomes more severe. Specifically, as r increases, the optimum effort level, a^*, increases for both Big 4 and non–Big 4 firms. In addition, while $a^*_B > a^*_{NB}$ for any value of r, the difference in a^* between Big 4 and non–Big 4 firms decreases as r increases (see the paragraph preceding Hypothesis 3). Because audit fees can be affected by factors outside the model, such as country specific differences in the degree of market competition and hence possible rents in fees, it is interesting and useful to also examine the behavior of auditor effort across different legal environments.

We cannot provide a full test of this issue in this paper; however we can report preliminary results based on four audit effort (total audit hours) data sets as follows: (a) a sample of 249 audits of manufacturing and trading companies by KPMG in the United States in 1989 (O'Keefe, Simunic, and Stein 1994); (b) a sample of 113 audits of manufacturing and trading companies by both Big 4 (mostly Ernst & Young and PricewaterhouseCoopers clients) and non–Big 4 firms in the Netherlands in 1998–99 (Blokdijk, Drieenhuizen, Simunic, and Stein 2006); (c) a sample of 146 audits of manufacturing and trading companies by Ernst & Young in Australia in 2004–5 (data collected by D. Stokes, D. Simunic, and M. Stein); and (d) a sample of 697 audits of manufacturing companies by Big 4 and non–Big 4 firms in South Korea in 2001–2 (data collected by J. Kim, D. Simunic, M. Stein, and C. Yi).

TABLE 6
Results of alternative regressions for sensitivity tests (*t*-values in parentheses)

$$AUDFEE_{ijt} = \beta_0 + \beta_1 REGIME_i + \beta_2 BIG4_{ijt} + \beta_3 (BIG4_{ijt} * REGIME_i) + \delta_1 LNTA_{ijt} + \delta_2 INVREC_{ijt} + \delta_3 LOSS_{ijt} + \delta_4 ROA_{ijt} + \delta_5 LEV_{ijt} + \delta_6 ISSUE_{ijt} + \delta_7 NBS_{ijt} + \delta_8 NGS_{ijt} + \delta_9 CROSS_{ijt} + \delta_{10} INMR_{ijt} + \varphi_1 GDP_{it} + \varphi_2 FDI_{it} + \varphi_3 EQUITY_i + \varphi_4 DISCL_i + \varphi_5 B4DO_{it} + (Fixed\ Effect) + ErrorTerm$$

(0) Variable (pred. sign)	(1) Benchmark OLS regression	(2) Use of legal enforcement index as proxy for *REGIME*	(3) Use of instruments (GDP and legal origin) as proxy for *REGIME*	(4) Fama-MacBeth regression	(5) Alternative measure of non−Big 4	(6) Median quantile regression
Panel A: Test variables						
REGIME (+)	1.9322	0.5864	0.6524	2.1453	1.9689	1.9283
	(33.71*)	(5.22*)	(8.95*)	(29.09*)	(32.58*)	(34.66*)
BIG4 (+)	0.7885	2.0142	0.6709	0.9246	0.9103	0.7305
	(9.29*)	(10.48*)	(6.45*)	(9.02*)	(10.18*)	(8.87*)
BIG4**REGIME* (−)	−0.2030	−0.7732	−0.1137	−0.3688	−0.2220	−0.1882
	(−4.85*)	(−8.38*)	(−2.26†)	(−6.50*)	(−5.01*)	(−4.63*)
Panel B: Firm-specific control variables						
LNTA (+)	0.5404	0.2923	0.3169	0.5534	0.5442	0.5859
	(57.25*)	(38.37*)	(38.24*)	(51.12*)	(56.98*)	(63.98*)
INVREC (+)	1.4813	1.0655	1.1172	1.4232	1.4974	1.5073
	(36.13*)	(25.76*)	(26.67*)	(30.32*)	(35.65*)	(37.86*)

(The table is continued on the next page.)

TABLE 6 (Continued)

(0) Variable (pred. sign)	(1) Benchmark OLS regression	(2) Use of legal enforcement index as proxy for *REGIME*	(3) Use of instruments (GDP and legal origin) as proxy for *REGIME*	(4) Fama-MacBeth regression	(5) Alternative measure of non−Big 4	(6) Median quantile regression
Panel B (Continued)						
LOSS (+)	0.2543	0.2139	0.2089	0.2431	0.2583	0.1976
	(10.46*)	(8.46*)	(8.28*)	(7.84*)	(10.35*)	(8.37*)
ROA (−)	−0.2303	−0.4490	−0.4268	0.1625	−0.2321	−0.3117
	(−4.31*)	(−8.12*)	(−7.72*)	(2.10†)	(−4.21*)	(−6.01*)
LEV (+)	0.2137	0.3906	0.3719	0.4329	0.2214	0.1707
	(9.52*)	(17.08*)	(16.12*)	(14.03*)	(9.54*)	(7.83*)
ISSUE (+)	0.0296	0.1561	0.1185	0.0123	0.0343	0.0103
	(1.23)	(6.25*)	(4.73*)	(0.47)	(1.38)	(0.44)
NBS (+)	0.1257	0.1061	0.1068	0.1301	0.1247	0.0867
	(18.47*)	(15.01*)	(15.14*)	(15.61*)	(17.82*)	(13.13*)
NGS (+)	0.1858	0.1948	0.1865	0.1746	0.1876	0.1798
	(23.14*)	(23.34*)	(22.31*)	(15.84*)	(22.77*)	(23.06*)
CROSS (+)	0.3329	0.2599	0.2534	0.3243	0.3563	0.3258
	(11.05*)	(8.30*)	(8.09*)	(9.54*)	(11.58*)	(11.14*)
INMR (?)	2.1710	−1.8089	−1.4045	2.4007	2.2328	2.2378
	(17.36*)	(−20.90*)	(−14.33*)	(16.48*)	(17.51*)	(18.45*)

(The table is continued on the next page.)

TABLE 6 (Continued)

(0) Variable (pred. sign)	(1) Benchmark OLS regression	(2) Use of legal enforcement index as proxy for *REGIME*	(3) Use of instruments (GDP and legal origin) as proxy for *REGIME*	(4) Fama-MacBeth regression	(5) Alternative measure of non–Big 4	(6) Median quantile regression
Panel C: Country-level control variables						
GDP (?)	−0.0003	0.0467	0.0295	−0.0036	−0.0010	−0.0008
	(−0.23)	(26.34*)	(15.39*)	(−2.01†)	(−0.68)	(−0.61)
FDI (?)	0.0249	−0.0047	0.0009	0.0245	0.0251	0.0231
	(14.56*)	(−2.87*)	(0.50)	(4.94*)	(14.49*)	(13.89*)
EQUITY (?)	−0.0142	−0.0576	−0.0596	−0.0048	−0.0144	−0.0054
	(−5.59*)	(−23.61*)	(−24.29*)	(−1.51)	(−5.58*)	(−2.21†)
DISCL (+)	2.7179	1.7236	2.1617	2.6685	2.5715	2.8990
	(17.92*)	(10.37*)	(13.99*)	(14.04*)	(16.62*)	(19.68*)
B4DO (+)	0.0662	0.0662	0.0590	0.0610	0.0682	0.0601
	(24.80*)	(21.40*)	(20.81*)	(19.24*)	(24.99*)	(23.18*)
Intercept	−7.1616	−0.0755	−0.0488	−7.9576	−7.3772	−7.8229
	(−26.89*)	(0.26)	(−0.21)	(−25.61*)	(−27.08*)	(−30.27*)
Fixed-effect dummies	Included	Included	Included	Included	Included	Included
Adj. R^2	0.5431	0.5056	0.5065	0.5615 (average)	0.5469	0.3564 (pseudoR^2)
n	21,559	21,559	21,559	21,559	20,752	21,559

(The table is continued on the next page.)

TABLE 6 (Continued)

Notes:

Variables are as defined in Table 1.

* Significant at the 0.01 level (one-tailed where signs are predicted, two-tailed otherwise).

† Significant at the 0.05 level (one-tailed where signs are predicted, two-tailed otherwise).

Note that Wingate (1997) assigns the following legal regime scores to the countries represented by these samples: United States = 15; Australia = 10; Netherlands = 6.2; and South Korea = 3.6. Thus our predictions with respect to auditor effort are as follows:

HYPOTHESIS 1a. *US* (*KPMG*) > *Australia* (*Ernest & Young*) > *Netherlands* (*Big 4*) > *Korea* (*Big 4*)*; Netherlands* (*non–Big 4*) > *Korea* (*non–Big 4*)

HYPOTHESIS 2a. *Netherlands* (*Big 4*) > *Netherlands* (*non–Big 4*)*; Korea* (*Big 4*) > *Korea* (*non–Big 4*)

HYPOTHESIS 3a. [*Netherlands* (*Big 4*) − *Netherlands* (*non–Big 4*)] < [*Korea* (*Big 4*) − *Korea* (*non–Big 4*)]

To obtain preliminary evidence concerning these predictions, we regressed the log of total audit hours on the log of total assets (to control for client size differences) for the six subsamples described above (four Big 4 subsamples and two non–Big 4 subsamples). We then calculated predicted audit hours, which will fall on a straight line for each subsample and found that the pattern of predicted audit hours is fully consistent with Hypotheses 1a, 2a, and 3a. The only unusual finding, which is discussed in Blokdijk et al. 2006, is that the Dutch Big 4 and non–Big 4 predicted audit hours are virtually the same. However, as predicted in Hypothesis 3a, Korean Big 4 and non–Big 4 audit hours (given client size) are quite different, with Big 4 hours being much larger than non–Big 4 hours. Note that this evidence is only suggestive because it involves a comparison of point estimates of audit hours by various firms in various circumstances, without testing the statistical significance of any differences. A formal test is left for future research.

7. Summary and concluding remarks

In this paper, we expand the scope of the existing audit fee literature from a single-country setting to a cross-country setting where firm-level audit fees are linked to client characteristics as well as to a country's legal environment. In doing so, we first develop a formal model in which national legal environments play a crucial role in influencing auditor effort, which in turn affects audit fees. We then empirically test the model's predictions about the effects of the strictness (strength) of a

country's legal liability regime on audit fees and on the fee spread between Big 4 and non–Big 4 auditors (i.e., the Big 4 premium). Our results can be summarized as follows.

First, we find that the strength or strictness of a country's legal liability regime is an important fee-increasing factor, after controlling for the client firm-specific fee determinants and other country-level, institutional/macroeconomic variables. Second, we find that given a legal liability regime, Big 4 auditors charge higher audit fees than non–Big 4 auditors, after controlling for other fee determinants. Third, we find that the Big 4 premium decreases as countries' legal liability regimes change from weak to strong regimes. Fourth, we document that the effect of legal regime on audit pricing and Big 4 premium is more salient for small and medium-sized firms than for large firms, and we provide evidence that the marginal effects of most firm-specific fee determinants on audit fees differ systematically between countries with strong legal regimes and countries with weak legal regimes, suggesting that the strictness of a country's legal liability regime is an important factor explaining variations in the audit fee structure across countries with different legal environments. Finally, we present preliminary evidence using auditor effort data from proprietary audit hour samples, which is consistent with all of our hypotheses.

In sum, our results suggest that future audit fee research should pay more attention to country-level, institutional factors that potentially affect the pricing of audit services through their effects on auditors' effort costs and expected legal liability costs. Given the scarcity of empirical evidence on the issue, further research along this line would be interesting and fruitful.

Endnotes

1. According to Hay, Knechel, and Wong 2006, among the 63 studies that investigate audit fee structures, 42 studies document significant Big 4 premiums from different countries, whereas the remaining 21 studies fail to do so. In summary, the evidence on the existence and magnitude of Big 4 premiums across countries is mixed at best.
2. Recently several studies have begun to investigate auditing-related issues in cross-country contexts. For example, Fan and Wong (2005) examine the association between corporate transparency and auditor choices in East-Asian countries. Using a sample of firms from 39 countries, Choi and Wong (2007) investigate the association between auditor choices and countries' legal environments and find that national legal environments influence the demand for audit services. However, both studies pay little attention to the role of legal environments in audit pricing.
3. Our model is an extension of Dye 1993, 1995. Similar to Dye, we assume that the auditor chooses an effort level to minimize the sum of the expected legal liability costs and effort costs. However, our model structure is different from Dye's in many ways. In particular, we include in the model a parameter r to capture the strength of legal regimes of different countries. This allows us to study the effect of the strength of legal regimes on auditor effort and audit fees. We also separately consider the legal liability of the Big and non–Big auditors to study the Big auditor fee premium within a legal regime and across different regimes.

4. For simplicity, we assume p is a constant. However, in a sensitivity analysis, we allow the probability of misstatement to increase as the legal regime becomes weaker; that is, $\mathrm{p}'(r) > 0$; but our key results and hypotheses remain unchanged under the mild condition that $1 - p - r\mathrm{p}'(r) > 0$.
5. As argued in Liu and Simunic 2005 (682), these assumptions of audit technology are reasonable because they reflect the real-world situations that (a) an auditor will not find any misstatement in the manager's financial report when there is no misstatement and (b) an auditor may fail to detect material misstatements in the manager's financial report when the report is misstated.
6. A limitation of the model is that we consider only the auditor's effort choice. To consider both the effort and reporting strategies would require a multiperiod model and/or the opportunity to provide nonaudit services, which is beyond the scope of the simple model of this study.
7. For more discussion of this issue, see De Angelo 1981, Dye 1993, Simunic and Stein 1996, and Kim, Chung, and Firth 2003.
8. Note that assuming a nonzero reservation payoff for the auditor will not change the results of our analysis.
9. This property is called the envelope theorem. For more details, see Varian 1992 (491).
10. Mathematically, it can be shown that $\partial\mu/\partial L = \partial\mu(a^*, L)/\partial L + [\partial\mu(a^*, L)/\partial a^*][\partial a^*/\partial L] = k^2/[4rL^2(1-p)] - k^2/[2rL^2(1-p)] < 0$.
11. Note here that the term, $(1-p)r(1-a_i)^2L_i$ represents the expected damage award ordered by the court, which is the same as the expected legal liability cost to an auditor arising from audit failure.
12. Under the assumption that the audit market is competitive, all the value of an audit accrues to the owner. This means that the owner's payoff from an audit is the same as the value of the audit.
13. This discussion focuses on the relation that $(1 - a^*_{NB}) > (1 - a^*_B)$. But note that $(1-p)(1-a)^2L$ also depends on L, and $L_{NB} < L_B$. However, as shown by (8), the relation that $(1 - a^*_{NB}) > (1 - a^*_B)$ plays a dominant role in driving the inequality. So we have focused on the dominant factor in our discussion of the intuition for the result.
14. To illustrate, let r_1 and r_2 denote strong and weak regimes, respectively — that is, $r_1 > r_2$. It is then straightforward to show that $(f_B - f_{NB})|_{r=r_1} - (f_B - f_{NB})|_{r=r_2} = -[k^2(1-q)(r_1 - r_2)]/[4(1-p)r_1r_2qL_B] < 0$. This means that the Big 4 fee premium is greater in a weak legal regime than in a strong legal regime.
15. As an alternative measure, we also use the legal enforcement index (La Porta et al. 1997), the efficiency of the judicial system index (La Porta, Lopez-De-Silanes, Shleifer, and Vishny 1998), and the law and order index (La Porta et al. 1998). The use of these alternative indices, however, yields qualitatively identical results. In section 6, we revisit the issue and report the result using the legal enforcement index as part of our sensitivity checks.
16. To obtain the inverse Mills ratio, we estimate the following probit auditor-choice model in the first stage, which is similar to the model used by Choi and Wong (2007): $\Pr(BIG4_{ijt}) = \xi_0 + \xi_1 LNTA_{ijt} + \xi_2 INVREC_{ijt} + \xi_3 LEV_{ijt} + \xi_4 LOSS_{ijt} + \xi_6 ISSUE_{ijt} + \xi_7 LAW_i + \xi_8 GDP_{it} + \xi_9 FDI_{it} + \xi_{10} EQUITY_i + ErrorTerm$, where the dependent

variable is the probability of Big 4 auditor choice, which is ex post coded as 1 for Big 4 clients and 0 otherwise.

17. Wingate's 1997 litigation index has been used as a proxy for a country's litigation risk or legal environment in other studies as well, including Choi and Wong 2007 and Chung et al. 2004.
18. Note that in all regressions throughout the paper, the *REGIME* variable is defined as the natural log of Wingate's litigation index. In Table 1, however, we report Wingate's index itself (before taking the natural log) to help readers identify which countries belong to the strong *REGIME* or weak *REGIME* countries. We also use the Wingate index of 7 as a cutoff score for partitioning the sample and repeat all the analyses. Though not reported, the results using this alternative cutoff score remain qualitatively similar.
19. To address the potential multicollinearity problem caused by these correlations, we repeat the tests without *ROA* and/or *INMR*, but the empirical results remain qualitatively identical.
20. Though not reported, as sensitivity checks, we also computed *t*-values for all regression coefficients reported in the paper, using clustered standard errors by each firm, country, or year to check the existence of potential serial correlation problems, using the White standard errors to correct for potential heteroscedasticity problems. However, the use of these alternative standard errors does not alter our statistical inferences.
21. We also repeat all the analyses with OLS methods after excluding U.K. and U.S. data, but the untabulated results are all qualitatively similar to those reported in the paper.
22. Because we use the natural log of audit fees as the dependent variable (i.e., *AUDFEE*) in (9), the percentage of Big 4 premium can be computed as $100(e^{\beta_2} - 1)$, where β_2 is the coefficient on *BIG4*. Using a similar approach, the coefficient of *REGIME* ($\beta_1 = 1.6489$) is translated into 336 percent premium for the average firm in strong legal *REGIME* countries compared with that for the average firm in weak legal *REGIME* countries.
23. This is greater than the percentage of Big 4 premium reported in most previous studies. For example, using Australian data, Craswell et al. (1995) report that Big 4 auditors earn a 30 percent premium over non–Big 4 auditors. Simon, Teo, and Trompeter (1992) and Chan et al. (1993), respectively, report a Big 4 premium of about 31 percent in Hong Kong and 36 percent in the United Kingdom. However, similar to this study, Ireland and Lennox (2002) report a Big 4 premium of 53.7 percent for their U.K. sample.
24. In terms of economic significance, the results for (2) in Table 3 translate into the Big 4 premium of about 24 percent for the U.S. sample and about 40 percent for both the Australian and Hong Kong samples.

    Audit fees of the same firm from different years are highly correlated. Because we use the seven-year pooled sample in our main analyses, the correlation may cause serial correlation problems. To address this problem, we estimate a clustered standard error by each firm. The regression results using this approach do not alter statistical inferences on our test variables. For example, the *t* value for β_3 using the clustered standard error decreases to -4.37 and -2.51 from -7.88 and -4.85 in columns (2) and (4), respectively, but it remains significant at the 1 percent level. Additionally, we perform year-by-year analyses that will be explained later as a part of sensitivity checks.

25. The coefficient on *ISSUE* is significant when we perform analyses without *INMR*, but it becomes insignificant when we include *INMR*.
26. Note that the significantly positive coefficients on *LEV* and *LOSS* are in line with U.S. evidence documented by Simunic 1980 and Simunic and Stein 1996, but are contrary to non-U.S. evidence documented in previous research (e.g., Francis 1984; Chung and Lindsay 1988; and Seetharaman et al. 2002).
27. Without the inclusion of the *INMR* variable, the *GDP* variable has a significantly positive coefficient in the OLS regressions. A plausible reason for why the *GDP* variable becomes insignificant when both variables are included is the relatively high correlation of −0.35 between the two variables, as documented in Table 2.
28. As indicated in Table 1 and mentioned in section 4, the strong *REGIME* sample consists of five countries (Australia, Hong Kong, New Zealand, United Kingdom, and United States), while the weak *REGIME* sample consists of 10 countries (Denmark, India, Ireland, Italy, Malaysia, Norway, Pakistan, Singapore, South Africa, and Sweden).
29. The interpretation of the significance of the *BIG4* variable in country-by-country analyses must be conducted with caution given that the small sample size in some countries may cause the lack of statistical power. Thus, we interpret only the magnitude of the average (across countries) coefficient, not the level of statistical significance. In our country-by-country analyses, we find that the coefficient on the *BIG4* variable is statistically significant at the 5 percent level for five weak *REGIME* countries (India, Italy, Malaysia, Norway, and South Africa), but only for one strong *REGIME* country (United States).
30. When we add five country-level control variables (*GDP*, *FDI*, *EQUITY*, *DISCL*, and *B4DO*) to (10) and perform the analyses again, the results are also qualitatively similar. The coefficient of *BIG4* is 0.2911 for strong *REGIME* countries and 0.6794 for weak *REGIME* countries. The difference is significant at the 1 percent level.
31. We thank an anonymous reviewer of this paper for bringing this point to our attention.
32. There are two possible alternative explanations for the insignificant results for the large client companies. The first explanation is the lack of statistical power if the large clients are predominantly audited by Big 4 auditors. However, the market share of the Big 4 auditors for this group of clients is 89.41 percent in our sample, which indicates that there is still a lot of variability in the choice of Big 4 versus non−Big 4 auditors. For medium-sized (small-sized) clients, the market share of the Big 4 is 85.02 percent (82.1 percent). The second explanation is multicollinearity. In order to control for the problem caused by multicollinearity, we drop *INMR* and five country-level control variables that are highly correlated with many other independent variables and repeat the analyses. However, the insignificant results for the large client sample do not change.
33. As a sensitivity check, we also estimated the regressions in Table 5 after excluding the country-level control variables (*GDP*, *FDI*, *EQUITY*, *DISCL*, and *B4DO*). Though not reported, the results are qualitatively similar to those reported in Table 5. In the WLS analyses, which are conducted to control for the effect of the unequal sample size for each country represented in the three size strata, the results are also qualitatively

similar in that the large client sample does not show significant results whereas the other two strata reveal significant results.

34. These sensitivity analyses are similar to those used in prior accounting research including Choi and Wong 2007 and DeFond and Hung 2004.
35. This index measures the quality of law enforcement in a country. It was constructed using a survey from investors from different countries. The index ranges from 1 to 10. For more details, see La Porta et al. 1997 and Leuz et al. 2003.
36. Auditors who charge a higher audit fee may be subject to greater legal payments in case of audit failure.
37. Year-by-year analyses reveal that the coefficient on *BIG4* is significantly positive for six out of seven yearly regressions, while the coefficient on *BIG4*REGIME* is significantly negative for five out of seven yearly regressions. The coefficient on *REGIME* is significantly positive across all the seven yearly regressions.
38. The use of alternative cutoff percentages of market share, such as 2.5 percent (which leads us to identify seven non–Big 4 auditors) or 2 percent (which leads us to identify nine non–Big 4 auditors), does not alter our results significantly.
39. Though not reported, we repeat all the regression analyses reported in the paper after treating these large non–Big 4 auditors as Big 4 auditors (i.e., $BIG4 = 1$), and find that, overall, the use of this new auditor classification scheme does not alter our inferences.

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