KNOWLEDGE SPILLOVERS OF AUDIT AND NONAUDIT SERVICES: THE CANADIAN EXPERIENCE

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ABSTRACT: *Recent research proposes that audit and nonaudit fees may be simultaneously determined and single-equation estimation could lead to biased estimation of the relations between audit and nonaudit fees (Antle et al. 2002; Whisenant et al. 2003). Audit and nonaudit fees are usually assumed to represent for the level of services provided. Using data for Canadian companies, with a single-equation as well as simultaneous specifications of audit fees and nonaudit fees, we find a significant positive effect of audit fees on nonaudit fees, indicating knowledge spillovers consistent with evidence reported by Antle et al. (2002) using UK data. Significant positive relation is observed from nonaudit to audit services only with single-equation specification. However, when the simultaneous determination of audit and nonaudit fees is incorporated in the estimation, the results show no direct effect of nonaudit fees on audit fees, implying no knowledge spillovers, which is consistent with results reported by Whisenant et al. (2003) using US data.*

JEL Classifications: *M41, M42.*

Keywords: *knowledge spillover, audit fees, nonaudit fees, endogeneity.*

INTRODUCTION

EARLIER research interpreted the observed significant association between audit and nonaudit fees as suggesting a beneficial knowledge spillover between audit and nonaudit services (Simunic 1984; Palmrose 1996; Davis *et al.* 1993; and Bell *et al.* 2001). These inferences were based on single-equation estimation of audit fee and nonaudit fee models. Recent research proposes that audit and nonaudit fees may be simultaneously determined (Antle *et al.* 2002; Whisenant *et al.* 2003), therefore, use of single-equation estimation may lead to biased estimation of the relation between audit and nonaudit fees. Whisenant *et al.* (2003) suggest the reason for simultaneity is that audit fees may be determined

by the level of nonaudit services provided by the auditor, and similarly, nonaudit fees may be a function of the level of audit services provided by the auditor. If so, both variables are endogenous to a system of equations. Further, both fee types have similar underlying determinants, including agency costs, complexity of client's operations, size, risk, performance, and the characteristics of the audit firm.

Based on U.S. data, Whisenant *et al.* (2003) report no association between audit and nonaudit fees when the system of audit and nonaudit fees equations is simultaneously estimated. They conclude that there is no evidence of knowledge spillovers. Using UK data, Antle *et al.* (2002) find evidence consistent with knowledge spillovers between the audit and nonaudit services while controlling for simultaneity in the determination of audit and nonaudit fees. Therefore, the evidence of possible knowledge spillovers due to providing both types of services is inconsistent across different reporting jurisdictions. The possibility of knowledge spillovers may be important to policy makers world-wide, as they grapple with the extent to which auditors should be allowed to provide various types of services.

In this study, we utilize data for Canadian companies to investigate whether or not there is evidence for knowledge spillovers of audit and nonaudit services. We use data on audit and nonaudit fees paid to auditors by Canadian firms listed on U.S. stock markets in 2002-2003. Using 198 firm-year observations, we find a significant effect of audit fees on nonaudit fees with single-equation estimation of nonaudit fees. This effect remains significant positive when we use simultaneous estimation of audit and nonaudit fees. The results indicate knowledge spillovers from audit services to nonaudit services consistent with results reported by Antle *et al.* (2002) for UK data.

With a single-equation specification of audit fees, we observe significant positive impact of nonaudit fees on audit fees. However, when the simultaneous determination of audit and nonaudit fees is incorporated in the estimation, the results show no significant effect of nonaudit fees on audit fees implying no knowledge spillovers consistent with results reported by Whisenant *et al.* (2003) for US data.

Our research contributes to the extant literature by analyzing the issue of knowledge spillovers of audit and nonaudit fees in another political jurisdiction, for which some of the underlying determinants of audit and nonaudit fees are also confirmed. Our results are interesting in that Canadian audit market resembles certain aspects of both the US and UK markets. We observe knowledge spillovers of audit fees on nonaudit fees similar to the UK experience and no impact of nonaudit fees on audit fees as reported in US.

The remainder of the paper is organized as follows. Section II discusses prior related literature and presents the hypotheses. Section III describes the research design and section IV presents empirical results. Section V concludes the paper.

PRIOR LITERATURE AND HYPOTHESIS

In an effort to improve audit quality, the U.S. Sarbanes-Oxley Act of 2002 prohibits auditors from providing any nonaudit services unless the company's audit committee preapproves the additional services. In June 2002, the Securities and Exchange Commission (SEC) also banned auditors from providing nonaudit services in nine specific areas that might impair auditor independence. On February 6, 2003 the SEC issued "*Final Rule: Strengthening the Commission's Requirements Regarding Auditor Independence*" requiring companies listed on U.S. exchanges to disclose audit fees, audit-related fees, tax fees and all other fees for each of the two most recent fiscal years. These firms include Canadian firms listed in US. The last three categories of fees disclosed relate to nonaudit services. The SEC enacted this legislation under the assumption that nonaudit services provided to audit clients impair auditor independence. The impairment occurs because of auditors' conflicts of interest between rendering an independent opinion while concurrently maintaining an economically significant business relationship with clients arising from the provision of nonaudit services (SEC 2000).

Economies of scope exist when one kind of service has a favorable impact on the other service, which might result in increased revenues or reduced costs. The accounting profession has argued that there are economies of scale and scope that enable auditors to perform audit and nonaudit services in an efficient and cost-effective manner. This can happen as auditors have idiosyncratic knowledge of clients operations placing them at a comparative advantage in providing both services. It has been suggested in the accounting literature that knowledge gained by auditors in their work would facilitate their provision of nonaudit services and *vice-versa*. This facet has been termed as "knowledge spillovers" (see Simunic 1984). The accounting profession contends that economies of scope in the bundling of audit and nonaudit services would be eliminated by the SEC's rule. If no such knowledge spillovers exist, then the SEC's rule would appear to allay the concerns of eliminating the economies of scope and scale.

Prior research has revealed that the relationship between audit and nonaudit fees is not straightforward. Simunic (1984), Palmrose (1986), Davis *et al.* (1993), Ezzamel *et al.* (1996) and Bell *et al.* (2001), among others, have documented a positive relation between audit and nonaudit fees, while Abdel-Khalik (1990) O'Keefe *et al.* (1994) found no such relationship. Using a single-equation estimation of an audit fees model, Simunic (1984) reports that audit fees are higher when the auditor also provides nonaudit services, interpreting th**is** association with the existence of client-specific knowledge spillovers from nonaudit to audit services. Palmrose (1986) indicates that audit fees are also higher when nonaudit services are provided by a supplier other than the incumbent auditor, which raises doubts about joint supply as an explanation for the positive association between audit and nonaudit fees and knowledge spillovers. Other studies, like Davis *et al.* (1993) and Bell *et al.* (2001), also report

that nonaudit fees significantly influence audit fees. All these studies used U.S. data. Similar results are also reported by Craswell and Francis (1999) using Australian data and by Ezzamel *et al.* (1996) using UK data. DeBerg *et al.* (1991) and Craswell (1999) also report a significant influence of audit fees on nonaudit fees inferring knowledge spillovers from audit to nonaudit services. Whisenant *et al.* (2003) argue that evidence of knowledge spillovers reported by these studies are artifacts of using a single-equation estimation of audit and nonaudit fees. Whisenant *et al.* (2003) and Antle *et al.* (2002) suggest audit and nonaudit fees are jointly determined which should be controlled when investigating the relationship between them. We propose the following hypotheses (in the null form) to test the relationships of audit and nonaudit fees:

H_{1A} : There are no knowledge spillovers from nonaudit to audit fees after controlling for simultaneity between these services.

H_{1B} : There are no knowledge spillovers from audit to nonaudit fees after controlling for simultaneity between these services.

Whisenant *et al.* (2003) estimate audit and nonaudit fees models using simultaneous-equation estimation and report no association between audit and nonaudit fees. Using U.S. audit and nonaudit fees data, they conclude that there are no knowledge spillovers. By contrast, using audit and nonaudit data from UK, Antle *et al.* (2002) find evidence consistent with knowledge spillovers between the two services even after controlling for simultaneity in determination of audit and nonaudit fees. Thus, the results vary across different political jurisdictions. In the current study we utilize data for Canadian companies to investigate whether there is evidence of knowledge spillovers, while controlling for simultaneity between audit and nonaudit services.

RESEARCH DESIGN

In this section we present audit and nonaudit fees models. The variables explaining nonaudit fees are identified from Parkash and Venable (1993), Firth (1997), DeFond *et al.* (2002), Frankel *et al.* (2002) and Whisenant *et al.* (2003) and give the following nonaudit fees model:

$$\begin{aligned} LNNAF = {} & \alpha_0 + \alpha_1 LNAUDIT + \alpha_2 LNTA + \alpha_3 SQSEGS + \alpha_4 LEV + \alpha_5 ROA \\ & + \alpha_6 INSTIT\_PCT + \alpha_7 SALES\ GROWTH + \alpha_8 BM + \alpha_9 RETURN \\ & + \alpha_{10} INITIAL + \alpha_{11} BIG5 + \alpha_{12} EMPPLAN + \alpha_{13} FINANCE + \alpha_{14} FOROPS \\ & + \alpha_{15} SPECIAL + \alpha_{16} MERGER + \varepsilon \end{aligned} \quad (1)$$

The determinants of audit fees are drawn from Simunic (1984), Palmrose (1996), Craswell *et al.* (1995), Craswell and Francis (1999), DeFond et al. (2002) and Whisenant *et al.* (2003) among others as follows:

$$\begin{aligned} LNAUDIT = {} & \beta_0 + \beta_1 LNNAF + \beta_2 LNTA + \beta_3 SQSEGS + \beta_4 LEV + \beta_5 INVREC \\ & + \beta_6 ROA + \beta_7 INSTIT\_PCT + \beta_8 VOLATILITY + \beta_9 BM + \beta_{10} LAG \\ & + \beta_{11} RETURN + \beta_{12} INITIAL + \beta_{13} BIG5 + \beta_{14} EMPPLAN + \beta_{15} FOROPS \\ & + \beta_{16} SPECIAL + \nu \end{aligned} \quad (2)$$

In equations (1) and (2), the independent variables included represent agency costs, complexity of operations, size, risk, performance, and the characteristics of the auditor. Following DeFond *et al.* (2002) and Whisenant *et al.* (2003), we define the variables as follows:

LNAUDIT = the natural log of the audit fees ($ actual);

LNNAF = the natural log of the sum of all nonaudit fees paid to the auditor ($ actual);

LNTA = the natural log of total assets ($ thousands);

SQSEGS = the square root of number of segments;

LEV = total debt divided by total assets;

INVREC = inventory plus accounts receivables divided by total assets;

ROA = operating income divided by total assets;

INSTIT_PCT = the percentage of institutional holding;

INITIAL = an indicator variable equal to 1 if the audit engagement is the initial two years;

*BIG*5 = an indicator variable equal to 1 when an auditor is a member of the BIG 5, 0 otherwise;

FOROPS = an indicator variable equal to 1 if the firm has foreign operations as indicated by foreign currency adjustments to income, 0 otherwise;

SALES GROWTH = growth rate in sales over the previous fiscal year;

VOLATILITY = the variance of the residual from the market model over the current fiscal year;

EMPPLAN = an indicator variable equal to 1 if the firm has a pension or post retirement plan, 0 otherwise;

BM = the book to market ratio;

SPECIAL = an indicator variable Indicator variable equal to the absolute value of negative special items divided by total assets (0 otherwise) at the end of current fiscal year;

LAG = number of days between fiscal year-end and earnings announcement date;

FINANCE = an indicator variable equal to 1 if the firm issues equity (>$10 million) or long-term debt (>$1 million) in either the current or subsequent fiscal year, 0 otherwise;

RETURN = the firm's raw stock return over the fiscal year.

MERGER = An indicator variable equal to 1 if the firm acquired another firm during the current fiscal year (0 otherwise);

If nonaudit and audit fees are determined independently, then equations (1) and (2) could be estimated separately and the use of ordinary least square (OLS) to estimate each of the two equations would be appropriate. However, when nonaudit and audit fees are simultaneously determined, the estimated coefficients of audit fees in equation (1) and nonaudit fees in equation (2) would be both biased and inconsistent (see Whisenant *et al.* (2003)). The endogeniety of these variables in the system of equations would give rise to a simultaneous-equation misspecification. Prior literature in accounting has used two-stage- least-square (2SLS), an instrumental variables (IV) approach, to estimate endogenous variables within the system of equations (see Beatty, Chamberlain, and Magliolo (1995)). In 2SLS approach, predicted values of *LNAUDIT (LNNAF)* from a first-stage regression of the endogenous variable on its instruments are substituted for actual values of *LNAUDIT (LNNAF)* in the second stage regression. Under fairly reasonable assumptions consistent and unbiased estimates are obtained (see Beatty *et al.* (1995)).

EMPIRICAL RESULTS

Sample

To construct our sample, we searched for audit and nonaudit fees data for all the 675 Canadian firms contained in Research Insight (i.e. Compustat) database for years 2002 and 2003. We use two sources to obtain the audit and nonaudit fees data for our sample firms. First, we obtained audit and nonaudit fees data from Compustat-provided audit and nonaudit fees database. Second, we searched the SEC Edgar database for proxy statements, 10-K, and 40-F filings to obtain audit and nonaudit fess data for the remaining firms. We could obtain audit and nonaudit fees data for 114 firms. For our analysis, we obtain accounting data from Compustat current and research files for industrial firms, institutional holding data from Compact Disclosure, and stock market data from CRSP. As reported in Panel A of Table 1, our final sample consists of 198 firm-years for which we have complete accounting, institutional, and stock market data. Panel B presents the industry distribution of the sample. Two of the industries (Durable Manufacturers and Mining & Construction) have higher firm-year observations than other industries.

Table 2 presents the distribution of audit, nonaudit, and total fees paid to auditors and auditor fees distribution by fiscal years. Panel A reports the audit, nonaudit and total fees by auditor type. The levels of audit, nonaudit and total fees paid to non-BIG5 auditors are smaller than the levels for BIG5 auditors. Nonaudit fees, as a percentage of total fees, are larger for BIG5 auditors than for non-BIG5 auditors. Panel B depicts audit, nonaudit, and total fees paid to auditors for each year. The levels of audit, nonaudit, and total fees increase, but audit fees as a percentage of total fees decreases from 2002 to 2003.

Table 1
Sample

Panel B: Sample Selection	
Number of Canadian Firm Years on Compustat (675 Firms)	1350
Less: Firm Years for Inactive Firms	(852)
Firm Years for Active Firms	498
Less: Firm Years With Missing Auditor Fees Data	(230)
Firm years with Audit and Nonaudit fees data	268
Less: Firm years with Missing Financial, Market, and Institutional Ownership Data	(70)
Total firm years with all the required data	198

Panel B: Sample Distribution by Industry	*Total*
Industry	Number (%)
Mining & Construction	29 (14.65)
Food	2 (1.01)
Textiles & Printing	12 (6.06)
Chemicals	7 (3.54)
Pharmaceuticals	17 (8.59)
Extractive	17 (8.59)
Durable Manufacturers	39 (19.70)
Transportation	19 (9.60)
Utility	7 (3.54)
Financial	13 (6.57)
Retail	4 (2.02)
Services	16 (8.08)
Computers	16 (8.08)
Total	198 (100)

Table 2
Distribution of Audit and Nonaudit Fees

Panel A: Audit and Non-Audit Fees Paid by Auditor Type

		Total Fees	*Audit Fees*		*Nonaudit Fees*	
Auditor Type	*Number*	*Median ($)*	*Median ($)*	*Median (%ofTotal)*	*Median ($)*	*Median (%of Total)*
Big 5	184	$770,215	$478,840	61.61	$321,693	38.39
Non-Big 5	14	$443,250	$161500	70.16	$106,500	29.85

Panel B: Audit and Non-Audit Fees Paid by Fiscal Year

		Total Fees	*Audit Fees*		*Nonaudit Fees*	
Fiscal Year	*Number*	*Median ($)*	*Median ($)*	*Median (%ofTotal)*	*Median ($)*	*Median (%ofTotal)*
2002	96	$618,263	$381,655	63.77	$246,922	36.23
2003	102	$839,021	$499,750	60.68	$349,484	39.32

Table 3 reports descriptive statistics for all the variables. It is worth noting that clients, on average, tend to purchase more audit than nonaudit services. While the average of audit fees paid to auditors for our sample is larger than the amount reported by Whisenant *et al.* (2003) and Frankel *et al.* (2002) for U.S. companies, firm size measured by total assets is larger for U.S. companies. The mean nonaudit fees is lower than the mean audit fees for our Canadian sample, whereas Whisenant *et al.* (2003) and Frankel *et al.* (2002) report higher mean nonaudit fees as compared to mean audit fees for US companies. The descriptive statistics also indicate that 93% of the sample firms use Big-5 auditors and 44% reported employee benefit plans. We also observe that 61% of the sample firms have foreign operations and that more than half (51%) issued equity or long-term debt in either the current or the subsequent year.

Table 3
Sample Distributions of Fees and Control Variables

Variable	*Mean*	*Median*	*Std. Dev.*
Audit Fees (AUDIT)	$1,001,985	$448,973	$1,792,162
Nonaudit Fees (NAF)	$922,420	$296,473	$2,319,194
Natural Log of AUDIT (LNAUDIT)	6.03	6.11	1.30
Natural Log of NAF (LNNAF)	5.41	5.69	2.21
Total Assets (TA) ($000)	$4,045,003	$444,347	$10,627,442
Natural Log of TA (LNTA)	13.24	13.00	2.17
Square Root of Segments (SQSEGS)	2.52	2.00	1.70
Debt to Assets (LEV)	0.45	0.42	0.25
Inv. & Rec. Intensity (INVREC)	0.17	0.14	0.15
Return on Assets (ROA)	-1.00%	5.00%	20.00%
Institutional Ownership (INSTITPCT)	21.05%	19.22%	17.00%
Yearly Growth in Sales (SALES GROWTH)	28.00%	12.00%	84.00%
Return Volatility (VOLATIL)	0.002	0.001	0.003
Book-to-Market (BM)	0.66	0.53	0.63
Reporting Lag in Days (LAG)	56	50	25
Fiscal Year Stock Return (RETURN)	51.58%	29.93%	107.56%
First or Second Year Audit (INITIAL)	6%		
Big 5 Audit Firm (BIG5)	93%		
Employee Benefit Plan (EMPPLAN)	44%		
New Financing (FINANCE)	51%		
Foreign Operations (FOROPS)	61%		
Special Items (SPECIAL)	4%		
Merger Activity (MERGER)	2%		

Single - and Simultaneous-Equation Estimation

We estimate equations (1) and (2) using 198 firm year observations from years 2002 and 2003. We control for year by including D2003, a year dummy. In our regressions, we control for industry effects by including 12 dummy variables

for industry classifications reported in Table 2A. For sake of brevity, we do not report coefficients for the industry dummies.

Table 4 presents the results of estimating equation (1) using both single- and simultaneous equation specifications. *LNAUDIT* is positive and significant (0.01 level, two-tailed) with single-equation estimation of audit fees model indicating significant positive influence of audit fees on nonaudit fees. This is consistent with the results reported in prior research. The coefficient of *LNAUDIT* remains significant (0.05 level, two-tailed) when audit and nonaudit fees equations are simultaneously estimated. Thus, hypothesis H_{1A} is rejected in favor of the alternative hypothesis of knowledge spillovers from audit to nonaudit services. This evidence suggests that companies consider the level of audit fees in determining the level of nonaudit fees procured from auditors consistent with knowledge spillovers from audit services to nonaudit services. Using simultaneous-equation specification the nonaudit fees model explains 62% of the variation in nonaudit fees. The coefficients *BM, RETURN, SALES GROWTH, EMPPLAN* and *SPECIAL* are significant (0.10 level, one-tailed) with predicted signs.

Table 4
Single- and Simultaneous-Equation Estimation of Nonaudit Fees (LNNAF)

	Predicted Sign	*OLS estimate*	*t-stat*	*2SLS Estimate*	*t-stat*
INTERCEPT	?	0.931	0.84	-0.879	-0.27
LNAUDIT	?	0.736	6.14***	1.025	2.00**
LNTA	+	0.061	0.75	-0.072	-0.29
SQSEGS	+	0.031	0.72	0.017	0.32
LEV	+	-0.428	-1.09	-0.479	-1.14
ROA	?	0.605	1.25	0.561	1.12
INSTIT_PCT	+	0.003	0.62	0.004	0.77
SALES GROWTH	+	0.230	2.49***	0.237	2.39***
BM	-	-0.204	-1.47*	-0.280	-1.38*
RETURN	-	-0.188	-2.20**	-0.196	-2.22**
INITIAL	-	0.271	0.87	0.331	0.97
BIG5	+	0.398	1.34*	0.306	0.88
EMPPLAN	+	0.521	2.51***	0.440	1.80**
FINANCE	+	-0.069	-0.41	-0.019	-0.10
FOROPS	+	-0.121	-0.72	-0.164	-0.87
SPECIAL	+	1.483	1.95**	1.263	1.48*
MERGER	+	0.232	0.40	0.182	0.30
D2003	?	0.094	0.56	0.069	0.39
Observations		198		195	
F-statistic		13.80		11.89	
p-value		0.000		0.000	
Adjusted R^2		0.65		0.62	

LNAUDIT Natural log of audit fees in actual US dollars.
LNNAF Natural log of nonaudit fees in actual US dollars.

LNTA	Natural log of total assets (Compustat ADI#6) measured in $ thousands at the end of fiscal year.
BIG5	An indicator variable equal to 1when the auditor is a big 5 accounting firm (0 otherwise), where auditor data are obtained from Compustat (ADI#149), proxy statements, form 10-K filings, or form 40-F filings.
ROA	Return on assets defined as operating income (Compustat ADI#178) divided by TA measured at the end of fiscal year.
RETURN	Stock return (unadjusted) over the current fiscal year, where return data are obtained from CRSP.
LEV	Total Liabilities (CompustatADI#181) divided by total assets at the end of current fiscal year.
INVREC	Inventory plus accounts receivables (Compustat ADI#3+ADI#2) divided by total assets at the end of current fiscal year.
INSTIT_PCT	The percentage of shares held by institutional investors at the beginning of the fiscal year obtained from Compact Disclosure-SEC.
SPECIAL	Indicator variable equal to the absolute value of negative special items (Compustat ADI#17) divided by total assets (0 otherwise) at the end of current fiscal year.
BM	The book to market ratio at the beginning of the current fiscal year.
SQSEGS	The square root of the number of business segments for the current fiscal year obtained from Compustat Business Segment File, Compact Disclosure-SEC, form 10-K filings, or form 40-F filings.
FOROPS	An indicator variable equal to 1 if the firm has foreign operations (0 otherwise) during the current fiscal year as indicated by foreign currency adjustment to income (Compustat ADI#150).
EMPPLAN	An indicator variable equal to 1 if the firm has a pension or post-retirement benefit plan (0 otherwise), where existence is defined as either current fiscal year plan assets or cost > $1 million.
LAG	Number of days between earnings announcement date (Compustat report date of quarterly earnings) and current fiscal year-end.
INITIAL	An indicator variable equal to 1 if the firm changed auditor in either the current or the previous fiscal year.
MERGER	An indicator variable equal to 1 if the firm acquired another firm during the current fiscal year (0 otherwise) where merger activity is defined as the presence of acquisition/merger special items after taxes (Compustat ADI#361).
FINANCE	An indicator variable equal to 1 if the firm issued equity (Compustat ADI#108 > $10 million) or long term debt (Compustat ADI#111 > $1 million) in either the current or the subsequent fiscal year (0 otherwise).
SALES GROWTH	Growth rate in sales (Compustat ADI#12) over the current fiscal year.
D2003	An indicator variable equal to 1 if the firm's current fiscal year is reported as 2003 by Compustat (0 otherwise).
***, **, *	Significance at the 0.01, 0.05, and 0.10 levels, respectively, based on one-tailed tests for signed predictions, two-tailed tests otherwise.

Table 5 presents the results of estimating equation (2) using both single- and simultaneous specifications. *LNNAF* is positive and significant (0.01 level, two-tailed) in single-equation estimation of audit fees model. Table 5 also presents the results of estimating equation (2) incorporating simultaneity of

audit and nonaudit fees equations. However, *LNNAF* has a positive but insignificant indicating that there is no direct influence of nonaudit fees on audit fees. Thus, we fail to reject hypothesis H_{1B} in favor of the alternative hypothesis. Therefore, there appears to be no knowledge spillovers from nonaudit to audit services. Simultaneous-equation specification of the audit fees model explains 80% of the variation in audit fees. The coefficients of *LNTA*, *SQSEGS*, *SQEMPLS*, *VOLATILITY*, *LAG*, and *FOROPS* are significantly positive as predicted (0.10 level, one-tailed). As predicted, the coefficient of *BM* is significantly negative (0.01 level, one-tailed).

Table 5
Single- and Simultaneous-Equation Estimation of Audit Fees (LNAUDIT)

	Predicted Sign	*OLS Estimate*	*t-stat*	*2SLS Estimate*	*t-stat*
INTERCEPT	?	3.926	6.10***	4.764	3.96***
LNNAF	?	0.228	5.70***	0.033	0.14
LNTA	+	0.420	9.30***	0.513	4.28***
SQSEGS	+	0.038	1.40*	0.051	1.56*
LEV	+	-0.026	-0.10	-0.184	-0.54
INVREC	+	0.478	1.11	0.558	1.19
ROA	?	-0.127	-0.42	0.040	0.10
INSTIT_PCT	+	-0.002	-0.79	-0.002	-0.64
VOLATILITY	+	45.780	2.02**	63.090	1.99**
BM	-	0.242	2.90***	0.216	2.28**
LAG	+	0.003	1.55*	0.004	1.64*
RETURN	-	0.051	1.02	0.022	0.35
INITIAL	-	-0.270	-1.51*	-0.241	-1.24
BIG5	+	0.160	0.93	0.287	1.21
EMPPLAN	+	0.060	0.48	0.178	0.92
FOROPS	+	0.152	1.57*	0.156	1.50*
SPECIAL	+	-0.183	-0.39	0.077	0.13
D2003	+	0.099	1.08	0.146	1.29*
Observations		195		195	
F-statistic		32.82		27.73	
p-value		0.000		0.000	
Adjusted R^2		0.83		0.80	

LNAUDIT	Natural log of audit fees in actual US dollars.
LNNAF	Natural log of nonaudit fees in actual US dollars.
LNTA	Natural log of total assets (Compustat ADI#6) measured in $ thousands at the end of fiscal year.
BIG5	An indicator variable equal to 1when the auditor is a big 5 accounting firm (0 otherwise), where auditor data are obtained from Compustat (ADI#149), proxy statements, form 10-K filings, or form 40-F filings.
ROA	Return on assets defined as operating income (Compustat ADI#178) divided by TA measured at the end of fiscal year.
RETURN	Stock return (unadjusted) over the current fiscal year, where return data are obtained from CRSP.

VOLATILITY	The variance of residuals from the market model over the current fiscal year.
LEV	Total Liabilities (CompustatADI#181) divided by total assets at the end of current fiscal year.
INVREC	Inventory plus accounts receivables (Compustat ADI#3+ADI#2) divided by total assets at the end of current fiscal year.
INSTIT_PCT	The percentage of shares held by institutional investors at the beginning of the fiscal year obtained from Compact Disclosure-SEC.
SPECIAL	Indicator variable equal to the absolute value of negative special items (Compustat ADI#17) divided by total assets (0 otherwise) at the end of current fiscal year.
BM	The book to market ratio at the beginning of the current fiscal year.
SQSEGS	The square root of the number of business segments for the current fiscal year obtained from Compustat Business Segment File, Compact Disclosure-SEC, form 10-K filings, or form 40-F filings.
FOROPS	An indicator variable equal to 1 if the firm has foreign operations (0 otherwise) during the current fiscal year as indicated by foreign currency adjustment to income (Compustat ADI#150).
EMPPLAN	An indicator variable equal to 1 if the firm has a pension or post-retirement benefit plan (0 otherwise), where existence is defined as either current fiscal year plan assets or cost > $1 million.
LAG	Number of days between earnings announcement date (Compustat report date of quarterly earnings) and current fiscal year-end.
INITIAL	An indicator variable equal to 1 if the firm changed auditor in either the current or the previous fiscal year.
MERGER	An indicator variable equal to 1 if the firm acquired another firm during the current fiscal year (0 otherwise), where merger activity is defined as the presence of acquisition/merger special items after taxes (Compustat ADI#361).
FINANCE	An indicator variable equal to 1 if the firm issued equity (Compustat ADI#108 > $10 million) or long term debt (Compustat ADI#111 > $1 million) in either the current or the subsequent fiscal year (0 otherwise).
SALES GROWTH	Growth rate in sales (Compustat ADI#12) over the current fiscal year.
D2003	An indicator variable equal to 1 if the firm's current fiscal year is reported as 2003 by Compustat (0 otherwise).
***, **, *	Significance at the 0.01, 0.05, and 0.10 levels, respectively, based on one- tailed tests for signed predictions, two-tailed tests otherwise.

CONCLUDING REMARKS

In this paper we have extended prior research on knowledge spillovers of audit and nonaudit fees to another political jurisdiction. Canadian firms appear to behave similar to U.S. firms with respect to no knowledge spillovers from nonaudit to audit services. However, Canadian firms are also similar to UK firms where they realize knowledge spillovers from audit to nonaudit services. We also find that some of the same underlying determinants of both audit and nonaudit fees as found in previous studies.

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