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The Pricing of National and City-Specific Reputations for Industry Expertise in the U.S. Audit Market

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ABSTRACT: The pricing of Big 5 industry leadership in the U.S. audit market is investigated using audit fee disclosures for the 2000–2001 fiscal years and the joint national-city framework in Ferguson et al. (2003). There is a significant fee premium of 19 percent on those engagements where Big 5 auditors are both the nationally top-ranked auditor and the city-level industry leader in the city where the client is headquartered, indicating that national and city-specific industry leadership *jointly* affect auditor reputation and pricing. However, there is *never* a premium in any tests for auditors that are national industry leaders alone without also being city-specific industry leaders, indicating that national leadership by itself does not result in a premium. The evidence is mixed with respect to city-specific industry leaders alone that are not also national industry leaders. While there is a premium of 8 percent in the primary tests, this result is inconclusive as it does not hold in all sensitivity analyses.

Keywords: *auditor industry expertise; Big 5 accounting firms; audit fees.*

Data Availability: *Data are publicly available.*

I. INTRODUCTION AND BACKGROUND

The purpose of this study is to examine the pricing of Big 5 industry expertise in the United States based on the joint national and city research framework in Ferguson et al. (2003). It is the first large-sample study of industry pricing in the U.S. and uses newly mandated audit fee disclosures beginning with 2000 fiscal-year data.[1] Two

[1] The fee data in our study are from the 2000 and 2001 fiscal years and pre-date the collapse of Arthur Andersen in 2002. For this reason the term ''Big 5'' is used in the paper and refers to the U.S. practices of the following international accounting firms: Arthur Andersen, Deloitte Touche, Ernst & Young, KPMG, and PricewaterhouseCoopers.

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research questions are investigated. First, is there evidence that Big 5 auditor industry expertise is priced in the U.S. audit market? Second, does the audit market price a Big 5 firm's national (firm-wide) reputation or city-specific (local-office) reputation for industry expertise? The appropriate definition and measurement of auditor industry expertise is an important but unresolved issue in auditing research (Hogan and Jeter 1999; Solomon et al. 1999; Gramling and Stone 2001; Krishnan 2001; Ferguson et al. 2003). Our study contributes to resolving this issue by examining audit fees to determine if the pricing of industry expertise in the U.S. audit market is based on a firm's national reputation (measured using total U.S. clientele), or alternatively local-office reputations (measured using city-specific clienteles).

Industry knowledge and expertise in auditing derives from the firm's human capital investments in accounting professionals and their experiences in servicing clients primarily out of city-based practice offices (Ferguson et al. 2003; Solomon et al. 1999). The central issue in the ''national'' versus ''city'' perspective on industry expertise is the degree to which office-specific expertise is transferable throughout the firm's network of practice offices and therefore the degree to which the reputation for industry expertise is local (office-specific) or firm wide. In other words, can a Big 5 firm ''capture'' the industry expertise of its office-based accounting professionals and distribute it to other offices in the firm's network, thus achieving a firm-wide reputation for industry expertise beyond specific offices where experts work and serve clients?[2] The argument for the ''national'' perspective assumes that accounting firms capture industry expertise through knowledge-sharing practices such as internal benchmarking of best practices, the use of standardized industry-tailored audit programs, and extending the ''reach'' of professionals from their primary local-office clientele to other clients through travel and internal consultative practices. The alternative viewpoint is that auditor expertise is indelibly tied to individual professionals and their deep personal knowledge of clients, and therefore cannot be readily captured and distributed by the firm to other offices and clients. Similar arguments have been made about human capital and client-specific expertise in law firms (Gilson and Mnookin 1985). The transferability of expertise implicit in the national perspective would be evidenced if national (firm-wide) reputation is priced by the audit market, but would not be supported if it turns out that only local office (city specific) reputation is priced.

Our study consistently shows across all tests that auditor reputation for industry expertise is neither strictly national nor strictly local in character. Rather, the evidence indicates that an auditor's reputation for industry expertise is priced when the firm is *jointly* the national industry leader and the city-specific industry leader where the client is headquartered. This is evidence that there is transferability of expertise across offices since national leadership does affect the audit fee premium. However, the results do not fully support this argument since auditors do not earn a fee premium on engagements when they are national leaders alone *without* also being the city-specific industry leader. There is also evidence that city-specific industry leadership alone (without also being a national industry

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[2] Ferguson et al. (2003) use the term *network externality* to describe the benefit to a Big 5 firm if office-specific industry expertise can be captured by the firm as a whole and transferred to other offices in the firm's network of practice offices. However, in the economics literature the term network externality (or network effect) is used more narrowly to describe situations in which the value of a good or service to a consumer increases as more people use the good or service. A classic example is a telephone network in which the value of telephone service increases as more people have telephones. In order to avoid any potential confusion over terminology, we use the term *transferability of expertise* in this paper rather than network externalities to explain the firm-wide reputation benefit to a Big 5 firm of capturing office-specific industry expertise and distributing it to other offices in the firm's network.

leader) may result in a fee premium, although this result does not hold in two of the study's sensitivity analyses and so the evidence is inconclusive on this point.

As discussed in the next section, there are important institutional differences between the U.S. and Australia, and our results contrast with the Australian evidence reported in Ferguson et al. (2003) in several important ways. First we find a premium only for the nationally top-ranked firm, whereas Ferguson et al. (2003) report a premium for each of the two top-ranked firms. In part this may reflect the fact that the top-ranked U.S. firm has such a large market share relative to the second-ranked firm (50 percent versus 22 percent), whereas in Australia the top two firms are closer in market share (28 percent and 24 percent). Second, as noted above, we find some evidence (albeit mixed) of a city-specific reputation effect in the U.S. without also being a national industry leader, whereas Ferguson et al. (2003) find a fee premium only for *joint* national-city leaders. Finally, compared to Ferguson et al. (2003), we conduct and report a far greater range of sensitivity analyses including alternative industry definitions, alternative measures of auditor industry leadership, and additional estimations to control for differences in company size.

Recent audit research uses ''national'' clienteles to measure auditor industry expertise and reports evidence of higher-quality audits by industry experts. For example, there is evidence that auditor industry expertise (based on national clienteles) is associated with higher-quality audits as evidenced by smaller abnormal accruals, which implies less earnings management, and a higher market valuation of earnings that suggest greater earnings quality (Balsam et al. 2003; Krishnan 2003). However, studies of audit quality may be even better focused if city-level dimensions are incorporated into the research design (Reynolds and Francis 2000). An example is a recent study by Krishnan (2005) that examines the Houston office of Arthur Andersen and finds that Andersen's Houston-office clients had significantly less conservative financial statements (pre-Enron) than did other Andersen offices or other auditors' Houston offices. The Houston example underscores the potential importance of investigating auditor behavior at the local-office level where engagement responsibility exists and auditor decision making occurs, in additional to the more conventional firm-wide studies (Wallman 1996).

The remainder of the paper is organized as follows. Relevant prior audit fee research is reviewed in the next section. The data and sample are described in Section III, and the research method is presented in Section IV. Results of the primary industry pricing tests are reported in Section V, and robustness and specification checks are reported in Section VI. Section VII concludes the study.

II. PRIOR RESEARCH

There has been limited investigation of U.S. audit pricing due to the lack of publicly available fee data, and prior empirical research on auditor industry expertise has relied primarily on Australian data because audit fees have been publicly disclosed in that country since the early 1970s.[3] Craswell et al. (1995) use Australian data from the mid-1980s and report a premium for Big 5 accounting firms that have larger industry market shares relative to other Big 5 firms. However, Ferguson and Stokes (2002) use the same research design and find that the industry premium documented in Craswell et al. (1995) diminished over

[3] DeFond et al. (2000) report evidence of an industry premium in the Hong Kong audit market. There are two U.S. studies that examined specialized industries but found no evidence of an industry specialist premium: Palmrose (1986) examines a sample of public utilities, and Pearson and Trompeter (1994) examine insurance companies. More recently, Casterella et al. (2004) use private survey data from the early 1990s for a broader sample of industries and report evidence of a Big 5 industry-specialist premium, but only for smaller publicly listed companies.

time and no longer existed by 1998. Most recently, Ferguson et al. (2003) re-examine the data in Ferguson and Stokes (2002) using a joint national and city framework and find that each of the two top-ranked Big 5 firms in industries (based on national market shares) earn a fee premium. However, they further document that the two top-ranked Big 5 firms earn a premium only for those engagements in which they are also the city-specific industry leader. In other words, it appears that *joint* national and city leadership drives auditor reputation for industry expertise in the pricing of Australian audits.

While the evidence in Ferguson et al. (2003) is compelling, the U.S. audit market is qualitatively different than Australia and therefore the results on industry specialization in Australia may not necessarily hold for the United States. The Big 5 accounting firms are more dominant and have a larger percentage of company audits in the U.S. Compustat data indicate the Big 5 audit around 85 percent of U.S. companies, compared to 65 percent in the Australian sample reported in Ferguson et al. (2003). At the city level in Australia, Ferguson et al. (2003) find that non-Big 5 firms are market leaders in 17 of 120 unique city-industry combinations, whereas in our U.S. sample the Big 5 firms are always city-level industry leaders. There are also many more publicly listed companies in the United States (approximately 10,000 U.S. companies in Compustat versus 1,084 Australian-listed companies reported in Ferguson et al. 2003), and more industry sectors in the United States (72 unique two-digit SIC codes in the Compustat population versus 24 stock exchange industry categories in Australia). U.S. companies are also much larger on average than Australian companies. The mean of total assets for companies in our U.S. sample is $1.9 billion, compared to mean assets of $40 million (USD) in Ferguson et al. (2003). Another important difference is that the mining sector in Australia comprises nearly half of its publicly listed companies. Except for the mining sector, there are generally more companies per industry in the United States. Collectively, these differences suggest that Big 5 auditor industry specialization is more plausible in the United States due to more industries, larger companies and larger industry sizes, and larger Big 5 clienteles within industries. In addition, with larger industry sizes the estimation of industry fee premia may be more reliable as well.

There are also important institutional differences between Australia and the United States that could affect audit pricing and that make it difficult to generalize from Australia to the United States. While Australia has broadly similar accounting standards as the United States, it generally has less detailed standards and reporting requirements (for example, there are only half-yearly interim reports rather than quarterly reports); its regulatory body, the Australian Securities and Investments Commission, appears to be less aggressive in policing companies and punishing auditors compared to the Securities and Exchange Commission (for example, there is nothing comparable to the SEC's Accounting and Auditing Enforcement Releases); and litigation is less likely to occur in Australia (Wingate 1997). All of these differences could affect the demand for auditor industry expertise and the pricing of audits.

The U.S. economy and audit market is also quite decentralized relative to Australia. The largest U.S. city in our study is San Francisco with 481 company headquarters and represents 16 percent of the total sample. The second largest city is New York with 428 companies and represents 14 percent of the total sample. In contrast, 84 percent of Australian publicly listed companies are headquartered in just three cities (Melbourne, Perth, and Sydney), and the Big 5 accounting firms have very few offices beyond those in Australia's five state capitals. By contrast, U.S. companies are widely dispersed around the country and the Big 5 accounting firms have from 91 (Deloitte Touche) to 115 (KPMG) separate practice offices based on recent website disclosures. The interplay of national and city-specific auditor reputation therefore is likely to be more complex in the U.S. and affected by the large number of offices, and the variation in offices, both across firms and within individual firms as documented in Francis et al. (1999). Since the Big 5 accounting firms have many more offices in the U.S. compared to just a handful in Australia, it may be more difficult for Big 5 firms in the U.S. to achieve the firm-wide transferability of office-specific industry expertise and, more generally, difficult to achieve a uniform firm-wide reputation across a divergent range of offices. Consistent with greater decentralization and geographical diversity in the U.S. audit market, the national industry leader is the city-specific industry in only 18 percent of the unique city-industry combinations in our U.S. sample, whereas Ferguson et al. (2003) document that the national industry leader is the city-level industry more than twice as often in Australia (44 percent of the unique city-industry combinations).

III. SAMPLE AND DATA

Our sample is restricted to U.S. publicly listed companies with Big 5 auditors and requires financial statement data and auditor fee data for the analysis. Financial statement data are obtained from the Compustat 2000 and 2001 annual research files, and auditor fee data come from annual proxy statements filed with the Securities and Exchange Commission and available electronically from Standard & Poor's and Emerson Research. In terms of Compustat years, the time period covered is the Compustat year 2000 (fiscal year-ends from June 1, 2000 to May 31, 2001) and the Compustat year 2001 (fiscal year-ends from June 1, 2001 to May 31, 2002). Both years are needed to complete the cycle of first-time audit fee disclosures. Fee disclosures began in proxy statements filed on February 5, 2001 for fiscal year-ends in December 2000. This means that companies with fiscal year-ends between June 1, 2000 and November 30, 2000 did not report their initial fee disclosures until the 2001 Compustat fiscal year. We start with 9,898 firm-year observations with Big 5 auditors and having audit fee data from Standard & Poor's (n = 7,695) which is the primary source, supplemented by Emerson Research (n = 2,203).

Table 1 shows the composition of the national and city samples for testing the pricing of Big 5 auditor industry expertise. Both samples meet the following screens: (1) is audited by a Big 5 accounting firm, (2) must have the required financial statement data on Compustat, (3) is not in the financial services sector (SIC codes 6000 to 6999), and (4) audit fees are reported for the first time. For the national sample, we remove 892 firm-year observations having audit fee data from Emerson Research but that could not be matched by CUSIP to the Compustat annual files, and we remove another 688 firm-year observations with missing Compustat data for model variables and/or observations that are foreign-based firms. We exclude 1,957 financial institutions because of their dissimilar nature to other industries. Finally, we limit the sample to first-time audit fee disclosures and thus exclude 2,367 firm-year observations reporting second-year audit fees, resulting in a total of 3,994 unique observations in 63 industries for the national sample.

The city sample is constructed in the same way as the national sample with one additional screen relating to the availability of city location indicators. We define cities using the U.S. Census Bureau definition of metropolitan statistical areas (MSA) to identify metropolitan areas based on state and county codes. As in Francis et al. (1999), the engagement office of the audit firm administering the audit is assumed to be located in the same city as the client's headquarters. Sample observations are assigned a city code based on the

TABLE 1
Sample Selection of Big 5 Audited Companies

	National Sample	City Sample
Big 5 observations with audit fees (2000 and 2001)		
Emerson Research	2,203	2,203
Standard & Poor's	7,695	7,695
Subtotal	9,898	9,898
Less:		
Companies unavailable on Compustat	(892)	(892)
Unmatched city (MSA) codes		(415)
Financial Sector (SIC 6000–6999)	(1,957)	(1,832)
Missing Compustat data or foreign firms	(688)	(585)
Second time reported audit fees	(2,367)	(2,352)
Less than two observations per city/industry		(777)
Final sample sizes	3,994	3,045

location of corporate headquarters as reported in Compustat. We delete 415 firm-year observations with city locales on Compustat that do not match the U.S. Census Bureau MSA codes.[4] Finally, we exclude city-level industry observations in those city-industry combinations in which there are fewer than two companies (777) because of the possibility of measurement error in the auditor city designation as explained in footnote 5, as well as the fact that there is unlikely to be a competitive audit market for city-level industry specialization if there is only one company in the industry for the city.[5]

The final city sample consists of 3,045 unique observations in 52 different industries, located in 77 cities. The overall ten largest cities in terms of total observations per city are: San Francisco (481), New York (428), Boston (255), Los Angeles (216), Dallas-Fort Worth

[4] Cities are classified by MSA as defined by the U.S. Census Bureau Office of Management and Budget. MSAs are comprised of specific counties, and these counties are denoted by a five-digit number consisting of two digits that indicate the state and the last three digits that indicate the county. For example, the Minneapolis-St. Paul MSA (No. 5120) has 13 distinct county codes in two separate states, Minnesota (11 counties) and Wisconsin (two counties). MSAs are identified for each audit client based on its headquarter county code and state code, available on Compustat, which are then matched to MSA five-digit county-state codes available in electronic format from the U.S. Census Bureau at http://www.census.gov/population/estimates/metro-city/99mfips.txt.

[5] Measurement error in the office designation is unlikely to bias tests in favor of the significant results we find, although it could potentially cause insignificant results. To verify the auditor's engagement office is in the same MSA as the client's headquarters, we randomly sampled 200 observations from the city sample of 3,822 observations (before excluding the 777 observations with only one observation in unique city-industry combinations). To do this we first created ten deciles based on audit fees, and then sampled proportionate to the magnitude of fees in each decile as follows: n = 109 randomly selected from decile one (the largest decile and representing 54 percent of total audit fees); n = 46 randomly selected from deciles two and three (23 percent of total audit fees); n = 21 randomly selected from deciles four and five (11 percent of total audit fees); and n = 24 randomly selected from deciles six through ten (12 percent of total audit fees). We obtained the following results: 22 (11 percent) of the 200 sampled items had the wrong city attributed to the auditor. This error rate is higher than the estimated error rate of 3 percent in Francis et al. (1999). However, 8 of these 22 errors had no impact on the correct identification of the city-level industry leader. So there are only 14 effective errors in the sample, which is an adjusted error rate of 7 percent. Of these 14 errors, a majority (nine) pertain to situations in which there is only one observation in the unique city-industry combination. Based on this we decided to exclude from the sample those city-industry combinations that have only one observation in order to minimize potential measurement error associated with the specification of city-level industry leadership. After we eliminate those city-industry combinations with only one observation, the revised sample error rate is 3.4 percent (i.e., the five remaining errors out of 145 sample observations from city-industry combinations with two or more observations).

(131), Houston (130), Chicago (128), Philadelphia (124), Washington-Baltimore (110), and Minneapolis-St. Paul (107). Within the 77 cities in the sample, there are a total of 481 unique city-industry combinations, and the national industry leader is the city leader in 18 percent of these 481 unique city-industry combinations. On average there are six observations per unique city-industry combination.

The measurement of Big 5 auditor industry leadership is based on each Big 5 firm's share of audit fees in industry groupings based on two-digit SIC codes, and industry expertise is assumed to be increasing in market share (Ferguson et al. 2003; Hogan and Jeter 1999).[6] Big 5 auditors are ranked from one to five based on their percentage of fees in the industry.[7] National reputation is measured using national market share rankings based on the full sample of 3,994 observations, and city-specific reputation is measured using city-specific clienteles. Table 2 summarizes the national Big 5 rankings for all 63 industries in the study. Averaged across all 63 industries, the Big 5 market shares are as follows: the top-ranked Big 5 firm has an average market share of 50 percent, the second-ranked firm has a market share of 22 percent, the third-ranked firm a market share of 14 percent, the fourth-ranked firm a market share of nine percent, and the fifth-ranked firm a market share of five percent. Leadership in the 63 industries is distributed as follows: Arthur Andersen (AA) is the national leader in 14 industries; Deloitte Touche (DT) is the national leader in 5 industries; Ernst & Young (EY) is the national leader in 15 industries; KPMG (KP) is the national leader in 9 industries; and PricewaterhouseCoopers (PW) is the national leader in 20 industries. There are no industries in which a non-Big 5 firm is industry leader.

City-specific reputations for Big 5 auditor industry expertise are measured for each industry in each city based on city-specific industry market shares. Big 5 auditors are ranked from one to five based on their percentages of fees in an industry for each particular city. Averaged across all 481 unique city-industry combinations, the top-ranked firm has an average city-level industry market share of 69 percent and the second-ranked firm has a 23 percent market share. City-level industry leadership in these 481 unique city-industry combinations is distributed among the Big 5 firms as follows: AA (105), DT (79), EY (105), KP (69), and PW (123).

It can be seen from the above data that each of the Big 5 firms is well represented in the distribution of industry leadership in both the national and city samples. Thus there is no concern that industry leadership might be a proxy for firm-specific reputations rather than the reputation effects of industry leadership. In addition, as a sensitivity analysis reported in Section VI, we drop each accounting firm one at a time and the results are qualitatively unchanged, which indicates that individual accounting firms do not drive the results.

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6 Audit fees are the only observable measure of output in the auditing industry. In our sample, the top-ranked firm nationally averages 50 percent of industry fees across all industries, compared to an average of only 22 percent for the second-ranked firm. Absent other information, it seems reasonable that dominant firms (industry leaders) are most likely to have a reputation for industry expertise to the extent that such reputations exist and matter in the audit market. It is possible of course that other firms (beside the top-ranked firm) have a reputation for industry expertise, but if this were true, then measurement error would bias against finding results for industry leaders.

7 Earlier studies use arbitrary market share percentages such as 10 or 15 percent to denote auditor industry specialists (Craswell et al. 1995; Ferguson and Stokes 2002). However, there is no way of knowing the level of market share that might distinguish between one firm being perceived to be a specialist while another firm is not. The advantage of using rankings is that we do not have to arbitrarily specify what these market shares are. It turns out that four industries have identical percentages rounded to nearest whole (SIC codes 32, 50, 57, and 99). We denote the firm with the largest absolute percentage as the top-ranked firm in Table 2. However, as sensitive analysis we code both the first- and second-ranked firm as industry leaders in these four industries, and these results are qualitatively the same as those reported in Table 4.

TABLE 2
Big 5 Industry Market Shares for National Sample (n = 3,994)

SIC Two-Digit Code	Industry Name	n	Total Big 5 Fees ($mil)	Percentage Distribution of Big 5 Audit Fees[a]: Top-Ranked Firm		Second-Ranked Firm		Third-Ranked Firm		Fourth-Ranked Firm		Fifth-Ranked Firm	
1	Agricultural production—crops	12	4.449	AA	40%	PW	27%	EY	22%	DT	9%	KP	2%
2	Agricultural production—livestock	1	0.068	EY	100								
7	Agricultural services	5	1.230	AA	60	EY	14	PW	14	DT	11		
9	Fishing, hunting, and trapping	1	0.226	EY	100								
10	Metal mining	12	3.675	PW	45	AA	42	EY	8	KP	3	DT	2
12	Coal mining	5	1.947	EY	91	KP	9						
13	Oil and gas extraction	123	45.826	AA	47	PW	30	KP	12	DT	6	EY	6
14	Nonmetallic minerals, except fuels	9	2.982	EY	37	AA	32	DT	24	KP	5	PW	2
15	General building contractors	4	0.683	EY	49	AA	37	KP	14				
16	Heavy construction contractors	11	5.329	EY	57	AA	21	PW	11	DT	9	KP	1
17	Special trade contractors	13	4.840	AA	62	KP	19	DT	10	PW	7	EY	2
20	Food and kindred products	79	71.153	PW	33	EY	24	KP	16	AA	14	DT	12
21	Tobacco manufactures	3	3.479	KP	54	PW	25	EY	21				
22	Textile mill products	16	7.645	EY	36	AA	26	PW	14	DT	13	KP	11
23	Apparel and other textile products	35	12.634	DT	45	EY	26	PW	15	AA	13	KP	1
24	Lumber and wood products	20	7.915	PW	42	AA	33	DT	15	EY	7	KP	3
25	Furniture and fixtures	24	12.055	AA	44	PW	27	DT	13	KP	9	EY	7
26	Paper and allied products	42	41.666	PW	33	AA	27	DT	15	KP	13	EY	12
27	Printing and publishing	55	30.645	EY	26	DT	22	KP	20	PW	18	AA	14
28	Chemicals and allied products	364	178.266	PW	36	DT	19	AA	19	KP	14	EY	12
29	Petroleum and coal products	17	40.009	PW	73	EY	15	AA	8	DT	3	KP	1
30	Rubber and miscellaneous plastics products	49	29.439	PW	42	EY	28	AA	18	KP	10	DT	3
31	Leather and leather products	16	5.327	KP	29	EY	27	DT	26	PW	11	AA	8
32	Stone, clay, glass, and concrete products	25	11.014	AA#	34	EY	34	PW	22	DT	8	KP	2

(*continued on next page*)

TABLE 2 (continued)

33	Primary metal industries	64	35.957	PW	54%	EY	21%	DT	13%	AA	10%	KP	2%
34	Fabricated metal products	64	34.382	PW	45	AA	18	KP	16	EY	16	DT	5
35	Industrial machinery and equipment	271	153.288	PW	32	EY	23	KP	20	AA	15	DT	9
36	Electrical and electronic equipment	359	141.395	PW	29	EY	26	KP	23	DT	12	AA	10
37	Transportation equipment	75	85.455	DT	31	PW	30	EY	23	AA	14	KP	2
38	Instruments and related products	297	89.471	PW	40	EY	21	AA	18	DT	11	KP	11
39	Miscellaneous manufacturing industries	32	13.091	PW	31	KP	21	AA	20	DT	18	EY	10
40	Railroad transportation	11	7.661	EY	31	DT	26	KP	20	PW	17	AA	7
42	Motor freight transportation and warehousing	32	7.691	AA	46%	EY	20%	KP	16%	DT	15%	PW	3%
44	Water transportation	14	4.256	EY	32	PW	27	DT	21	AA	12	KP	8
45	Transportation by air	32	16.443	AA	52	EY	28	KP	11	DT	9		
46	Pipelines, except natural gas	1	0.400	KP	100								
47	Transportation services	14	5.157	KP	41	PW	26	AA	22	EY	7	DT	4
48	Communications	149	103.877	PW	31	EY	30	AA	23	DT	9	KP	7
49	Electric, gas, and sanitary services	135	161.567	AA	55	DT	23	PW	16	EY	5	KP	2
50	Wholesale trade—durable goods	104	40.970	AA#	24	EY	24	PW	23	KP	19	DT	10
51	Wholesale trade—nondurable goods	63	58.812	AA	61	DT	14	EY	13	KP	7	PW	5
52	Building materials, hardware, garden supply, etc.	11	3.759	KP	43	EY	26	PW	23	DT	7		
53	General merchandise stores	30	24.368	KP	26	EY	25	DT	22	AA	17	PW	11
54	Food stores	21	9.741	DT	48	PW	32	KP	7	AA	6	EY	6
55	Automotive dealers and gasoline service stations	20	7.239	AA	44	DT	24	KP	14	PW	10	EY	8
56	Apparel and accessory stores	50	14.418	PW	31	DT	30	KP	20	AA	10	EY	9
57	Furniture, home furnishings, and equipment stores	20	4.847	EY#	29	DT	29	KP	26	PW	14	AA	3
58	Eating and drinking places	68	17.947	KP	31	EY	24	AA	23	DT	12	PW	11
59	Miscellaneous retail	92	38.010	DT	43	EY	20	AA	16	PW	12	KP	9
70	Hotels, rooming houses, camps, etc.	18	8.672	AA	80	PW	10	EY	5	KP	4	DT	2
72	Personal services	13	6.151	PW	79	AA	16	KP	4				
73	Business services	714	246.199	PW	32	KP	19	EY	19	AA	17	DT	13
75	Automotive repair, services, and parking	5	2.988	KP	94	AA	4	PW	2				
76	Miscellaneous repair services	2	0.174	DT	83	AA	17						

(*continued on next page*)

TABLE 2 (continued)

SIC Two-Digit Code	Industry Name	n	Total Big 5 Fees ($mil)	Percentage Distribution of Big 5 Audit Fees[a]: Top-Ranked Firm		Second-Ranked Firm		Third-Ranked Firm		Fourth-Ranked Firm		Fifth-Ranked Firm	
78	Motion pictures	11	10.951	EY	78	PW	14	KP	3	DT	3	AA	1
79	Amusement and recreational services	41	12.516	AA	48	DT	23	EY	11	PW	10	KP	9
80	Health services	74	26.150	EY	40	KP	24	AA	16	DT	11	PW	9
81	Legal services	1	0.111	EY	100								
82	Educational services	16	4.873	EY	30	AA	29	KP	20	PW	19	DT	2
83	Social services	13	2.983	KP	64	EY	15	AA	13	PW	8		
86	Membership organizations	1	0.121	PW	100								
87	Engineering and management services	111	29.941	PW	31	AA	20	KP	19	EY	15	DT	14
99	Unclassified	4	1.942	PW#	37	DT	37	AA	16	EY	10		
Total (mean market share percentages across all industries)		**3,994**	**$1,956.475**		**50%**		**22%**		**14%**		**9%**		**5%**

[a] Big 5 accounting firms abbreviations: AA = Arthur Andersen; DT = Deloitte Touche; EY = Ernst & Young; KP = KPMG; and PWC = PricewaterhouseCoopers. In four industries, the top-two firms round to the same whole percentage, but # denotes the firm with the larger absolute share. Sensitivity analysis using both firms as co-industry leaders results in qualitatively the same inferences.

IV. RESEARCH METHOD

A cross-sectional OLS audit fee regression model is used similar to that in Ferguson et al. (2003). Audit fee regression models use a set of variables to control for general cross-sectional differences in factors that affect fees, plus additional test variables of interest (Simunic 1980). In prior studies, these models have good explanatory power (adjusted R^2s of 0.70 and higher) and have been robust across different samples, time periods, countries, and sensitivity analyses for model misspecification (Francis and Simon 1987; Chan et al. 1993).

The auditor indicator variables test the effect of Big 5 industry expertise on audit pricing. The comparison group consists of observations audited by other (nonleader) Big 5 auditors, and the research design tests for differential audit fees through a cross-sectional comparison of audit fees of industry leaders with other accounting firms, after controlling for general factors affecting fees. Formally, the test determines if there is a significant positive intercept shift (higher fees) in the fitted regression model.

An innovation in our study is the use of an industry fixed-effects model with industry indicator variables defined at the two-digit SIC level to control for general industry-wide effects on audit pricing. Prior audit research has not controlled for average (intercept) differences in fees across industries.[8] All of the reported t-statistics in the study are two-tailed p-values and are corrected for heteroscedasticity (White 1980).

The following regression model is the study's primary audit fee model and uses a joint national-city framework to test three separate experimental auditor variables: an indicator variable that is coded 1 when the auditor is *both* national industry leader and city-specific industry leader where the client is headquartered; an indicator variable coded 1 if the auditor is the national industry leader (but not the city leader); and an indicator variable coded 1 when the auditor is the city industry leader (but not the national leader). The default comparison group is all nonleaders. The purpose of this model is to tease out if it is national reputation alone, city reputation alone, or joint national-city reputation that matters in the pricing of auditor industry expertise. For completeness and as a sensitivity analysis, we also estimate separate restrictive models using national industry leadership (alone) and city-specific industry leadership (alone) to measure auditor industry expertise.

The OLS regression model is specified as follows in Equation (1):

$$\begin{aligned} LAF = {} & b_0 + b_1 LTA + b_2 LSEG + b_3 CATA + b_4 QUICK + b_5 DE + b_6 ROI \\ & + b_7 FOREIGN + b_8 OPINION + b_9 YE + b_{10} LOSS \\ & + b_{11} JOINT\text{-}LEADER + b_{12} NATIONAL\text{-}ONLY + b_{13} CITY\text{-}ONLY \\ & + \textit{fixed effects} + e \end{aligned} \tag{1}$$

where:

LAF = natural log of audit fees in dollars;
LTA = natural log of total assets in millions of dollars;
LSEG = natural log of the number of unique business segments;
CATA = ratio of current assets to total assets;

[8] Adjusted R^2s increase by approximately 1.5 percent when adding the set of industry indicator variables, and most of the industry variables are significantly different from the default industry variable. Statistical inference on the auditor test variables are qualitatively unchanged using industry fixed effects, though for significant (insignificant) auditor variables the coefficients and t-statistics are slightly larger (smaller) relative to estimations without industry variables.

QUICK = ratio of current assets (less inventories) to current liabilities;
DE = ratio of long-term debt to total assets;
ROI = ratio of earnings before interest and tax to total assets;
FOREIGN = proportion of total sales from foreign operations;
OPINION = indicator variable, 1 = qualified audit report;
YE = indicator variable, 1 = non-Dec. 31 year-end;
LOSS = indicator variable, 1 = loss in current fiscal year;
JOINT-LEADER = indicator variable for auditors that are *both* national industry leaders and city-specific industry leaders where clients are headquartered;
NATIONAL-ONLY = indicator variable for auditors that are national industry leaders but *not* the city-specific industry leaders where clients are headquartered;
CITY-ONLY = indicator variable for auditors that are *not* national industry leaders but are the city-specific industry leaders where clients are headquartered;
Fixed effects = industry dummy variables for two-digit SIC industry classifications; and
e = error term.

The above model is identical to Ferguson et al. (2003) except for two variables, *LSEG* and *FOREIGN*. The number of business segments (*LSEG*) is used rather than the number of subsidiaries to measures business complexity because subsidiary data is not available for U.S. companies on Compustat. For the same reason, the variable *FOREIGN* is measured using the proportion of total sales that are from foreign operations, rather than the proportion of subsidiaries that are foreign subsidiaries. As in prior studies transformations are made to normalize some variables (*LAF, LTA,* and *LSEG*).

With respect to the ten control variables in the model, higher fees are expected (positive coefficients) for larger clients (*LTA*), for greater audit complexity (*LSEG* and *FOREIGN*), and for greater audit risk (*CATA, DE,* and *LOSS*). A positive coefficient is also expected for *OPINION* as prior studies document higher fees associated with modified opinions, possibly due to more investigative efforts in such circumstances. Negative coefficients are expected for the variables *QUICK, ROI,* and *YE*. *QUICK* is an audit risk variable and clients with a smaller quick ratio are riskier (less liquid) and therefore are expected to have higher audit fees. Prior studies find that clients with higher *ROI* have lower fees, which is consistent with auditor-client risk sharing, i.e., more profitable clients pose less risk to the auditor resulting in lower fees. Finally, clients with off-peak non-December 31st fiscal year-ends (*YE*) are expected to have lower fees. Descriptive statistics are reported in Table 3 for the national sample (n = 3,994) and city sample (n = 3,045). The two samples are comparable and only three variables are significantly different at $p < .01$: firms in the city sample have a larger mean for current assets (*CATA*), a smaller mean for long-term debt (*DE*), and a larger percentage of firms reporting losses (*LOSS*).

V. TESTS OF INDUSTRY EXPERTISE

Results of three model estimations are reported in Table 4. Models 1 and 2 are restrictive models using only a national-level auditor variable and a city-level auditor variable, respectively, and model 3 is the estimation of Equation (1) using the joint national-city framework. All three models are significant at $p < .001$ with adjusted R^2s of 0.74. The control variables are significant at $p < .05$ (two-tailed tests) in the expected direction, with the exception of *CATA, QUICK, DE,* and, *YE* (though *DE* is significant in model 1). Results

TABLE 3
Descriptive Statistics for the 2000–2001 Sample Data

	National Sample (n = 3,994)					City Sample (n = 3,045)				
Variables	**Mean**	**Median**	**Std. Dev.**	**Q1**	**Q3**	**Mean**	**Median**	**Std. Dev.**	**Q1**	**Q3**
Fees ($)	489,854	200,000	1,267,575	115,000	423,000	502,318	196,100	1,388,468	114,200	413,645
LAF	12.380	12.206	1.039	11.653	12.955	12.369	12.186	1.050	11.646	12.933
Assets ($millions)	1,912	218	8,052	66	845	1,944	193	8,795	59	745
LTA	5.527	5.387	1.927	4.189	6.739	5.432	5.262	1.937	4.079	6.613
SEG	2.111	1.000	1.545	1.000	3.000	2.048	1.000	1.533	1.000	3.000
LSEG	0.522	0	0.643	0	1.099	0.490	0	0.639	0.000	1.099
CATA	0.518	0.520	0.252	0.314	0.723	0.544	0.554	0.253	0.342	0.754
QUICK	3.065	1.460	12.534	0.848	2.833	3.515	1.649	14.281	0.953	3.201
DE	0.179	0.095	0.230	0.001	0.296	0.161	0.057	0.218	0	0.268
ROI	−0.065	0.050	0.453	−0.104	0.111	−0.088	0.039	0.468	−0.151	0.108
Foreign	0.142	0	0.223	0	0.241	0.153	0	0.228	0	0.268
Opinion	0.173	0	0.379	0	0	0.171	0	0.376	0	0
YE	0.319	0	0.466	0	1	0.305	0	0.461	0	1
Loss	0.441	0	0.497	0	1	0.473	0	0.499	0	1

Variable Definitions:
Fees = audit fees (dollars);
LAF = natural log of audit fees;
Assets = total assets (millions of dollars);
LTA = natural log of total assets;
SEG = number of business segments;
LSEG = natural log of business segments (*SEG*);
CATA = ratio of current assets to total assets,
QUICK = ratio of current assets (less inventories) to current liabilities;
DE = ratio of long-term debt to total assets;
ROI = ratio of earnings before interest and tax to total assets;
Foreign = proportion of foreign sales;
Opinion = indicator variable, 1 = qualified audit report;
YE = indicator variable, 1 = non-December 31st year-end; and
Loss = indicator variable, 1 = loss in current fiscal year.

TABLE 4
Big 5 Audit Fee Models for National, City, and Combined Analysis[a]
(Dependent variable is natural log of audit fees)

		National Industry Leadership Model 1			City Industry Leadership Model 2			Combined National and City Model Model 3		
Control Variables	**Exp. Sign**	**Estimate**	**t-statistic**	**Prob.**	**Estimate**	**t-statistic**	**Prob.**	**Estimate**	**t-statistic**	**Prob.**
Intercept		9.901	38.505	<0.001	10.335	102.606	<0.001	10.366	92.532	<0.001
LTA	+	0.434	63.395	<0.001	0.420	52.385	<0.001	0.419	52.474	<0.001
LSEG	+	0.213	14.604	<0.001	0.233	13.692	<0.001	0.234	13.763	<0.001
CATA	+	0.070	1.175	0.240	0.024	0.369	0.712	0.023	0.350	0.726
Quick	−	−0.005	−1.398	0.162	−0.004	−1.388	0.165	−0.004	−1.392	0.164
DE	+	0.102	2.302	0.021	0.077	1.257	0.209	0.082	1.339	0.181
ROI	−	−0.200	−4.944	<0.001	−0.222	−4.361	<0.001	−0.219	−4.362	<0.001
Foreign	+	0.622	13.959	<0.001	0.629	12.877	<0.001	0.626	12.784	<0.001
Opinion	+	0.201	8.094	<0.001	0.166	5.741	<0.001	0.165	5.719	<0.001
YE	−	−0.032	−1.720	0.086	−0.003	−0.163	0.871	−0.005	−0.226	0.821
Loss	+	0.064	2.724	0.006	0.020	0.708	0.479	0.019	0.687	0.492
Experimental Variables										
National Leader (Top Firm)		0.075	3.935	<0.001						
City Leader (Top Firm)					0.121	6.039	<0.001			
Both *National Leader* and *City Leader*								0.170	6.012	<0.001
National Leader but *not City Leader*								−0.032	−0.998	0.318
City Leader but *not National Leader*								0.074	3.051	0.002
F-statistic (p-value)			156 (<0.001)			142 (<0.001)			138 (<0.001)	
Adjusted R^2			0.739			0.742			0.742	
Sample size			3,994			3,045			3,045	

(*continued on next page*)

TABLE 4 (continued)

[a] Sample is Big 5 audited companies with audit fees reported by the client for the first time in 2000 or 2001. Model 2 and model 3 samples are restricted at the city level to a minimum of two observations per industry. Industry fixed effects variables are not reported for brevity. All t-statistics are two-tailed p-values and based on the White (1980) heteroscedasticity corrected covariance matrix.

Control Variables:

LTA = natural log of total assets (in millions);
LSEG = natural log of the number of segments;
CATA = ratio of current assets to total assets;
Quick = ratio of current assets (less inventories) to current liabilities;
DE = ratio of long-term debt to total assets;
ROI = ratio of earnings before interest and tax to total assets;
Foreign = proportion of foreign sales;
Opinion = indicator variable, 1 = qualified audit report;
YE = indicator variable, 1 = non-December 31st year-end; and
Loss = indicator variable, 1 = loss in current fiscal year.

for all three models are comparable when deleting extreme outliers with studentized residual errors greater than $+/-$ 3.[9]

The estimation of model 1 is an iterative process, starting with only one indicator variable for the nationally top-ranked firm in the first estimation, and then adding a second indicator variable for the second-ranked firm in the second estimation, and so on until the introduction of an additional ranking variable is not statistically significant. This iterative process results in only the nationally top-ranked Big 5 firm having a significant fee premium relative to the remaining Big 5 firms. When the second-ranked firm is added as a second indicator variable the coefficient is insignificant at $p > .10$ and the coefficient is close to 0. This result is consistent with the dominant market share of the top-ranked firm nationally (50 percent) relative to the second-ranked firm (22 percent). Thus the results for model 1 reported in Table 4 use a single auditor indicator variable that takes on the value of 1 if an auditor is the nationally top-ranked firm in an industry. The coefficient is 0.075, which is significant at $p < .001$, and the average premium of the nationally top-ranked industry leader is 7.78 percent.[10]

The estimation of model 2 follows the same iterative process, starting with the top-ranked firm at the city level in the first estimation, and adding a second indicator variable for the second ranked firm in the second estimation. The results indicate that only the top-ranked firm has a significant fee premium relative to other firms. Fees of the second-ranked firm are insignificant at $p > .10$ and the coefficient is close to 0. Thus the results for model 2 reported in Table 4 use a single auditor indicator variable coded 1 if the auditor is the city-level industry leader. The coefficient for city-level industry leaders is 0.121, which is significant at $p < .001$, and the average premium of the city leader is 12.86 percent. Note that the city leadership premium in model 2 (12.86 percent) exceeds the national leadership premium in model 1 (7.78 percent).

Model 3 is the primary model and tests the joint effect of national and city industry leadership on audit fees. The first experimental variable is coded 1 for 543 observations (18 percent of sample) in which the auditor is *both* national and city leader; the second experimental variable is coded 1 for 293 observations (ten percent of sample) in which the auditor is national industry leader but not the city leader; and the third experimental variable is coded 1 for 703 observations (23 percent of sample) in which the auditor is the city-specific industry leader but not the national leader. The default comparison group is the 1,506 observations (49 percent of sample) in which the auditor is neither national nor city industry leader.

The results of model 3 are as follows. Big 5 firms that are *both* the national industry leader and the city-specific industry leader have significantly higher fees than the default comparison group of firms, which are neither national nor city leaders. The coefficient is 0.170, which is significant at $p < .001$, indicating that fees are 18.53 percent higher on average. The fees of firms that are a national leader but *not* the city leader are not significantly different from the default comparison group (p-value of 0.318). However, firms that

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9 Deleting these extreme outliers result in the following. In model 1, national leader coefficient is 0.065 ($p = 0.0002$); in model 2 the city leader coefficient is 0.112 ($p < 0.0001$; in model 3 the joint national-city leader coefficient is 0.146 ($p < 0.001$), the city leader (alone) coefficient is 0.079 ($p = 0.0008$), and the national leader (alone) coefficient is -0.024 ($p = 0.4325$).

10 Using the procedure described in Craswell et al. (1995, 307), the fee premia is calculated as the percentage effect of the intercept shift on the dependent variable (natural log of audit fees), and is defined as $e^z - 1$, where z is the parameter value for auditors who are market leaders. Note that model 1 has 3,994 observations compared to 3,045 used to estimate models 2 and 3. When we restrict model 1 to 3,045 observations, the results are qualitatively the same as those in Table 4. The coefficient on the national leader is 0.073, significant at $p < .001$ and indicating a premium of 7.6 percent (compared to 7.8 percent in Table 4).

are city leaders but *not* national leaders have a coefficient of 0.074, which is significant at p = 0.002, representing a premium of 7.68 percent.

In sum, the evidence in Table 4 indicates that national and city reputations jointly affect audit pricing and the premium for industry expertise. The fact that national and city leadership jointly affect audit fees suggest an interplay between city (local-office) and national (firm-wide) reputation, and does provide at least weak evidence there is transferability of expertise and firm-wide reputation benefits. However, the fact that national leadership alone does not result in a fee premium, without also being the city leader, is evidence against the existence of ''strong'' firm-wide reputation effects arising from the transferability of office-specific expertise. Finally, model 3 provides evidence that city-specific industry leadership alone (without being a national industry leader) results in a fee premium, and our findings differ with Ferguson et al. (2003) on this point because they find a fee premium in the combined model only for firms that are joint national-city leaders. This result suggests that city-specific industry leadership is a sufficient condition for a fee premium, either alone or in conjunction in national leadership. However, since two of the sensitivity analyses reported in Section VI do not find a premium for city-specific industry leadership (alone), the overall evidence is mixed and inconclusive on this point.

Alternative Industry Definitions

The results in Table 4 are based on 63 (nonfinancial sector) industries defined using two-digit SIC codes. We investigate the robustness of these results to three alternative sets of industry definitions that are based on increasingly broader industry categories. Fama and French (1997) re-combine SIC codes to derive a smaller set of 48 industry groupings, 44 of which correspond to our sample that excludes the financial sector; Francis et al. (1999) re-combine SIC codes to derive 27 industry groupings of which 21 correspond to our sample; and Barth et al. (1998) re-combined SIC codes to derive 15 broad industry groupings of which 14 correspond to our sample.

The results in Table 4 for all three models are robust to these alternative industry definitions. For model 1, the national leader in Table 4 has a premium of 7.8 percent. For the alternative industry definitions, the national leader coefficient in model 1 is significant at $p < .01$ in all three estimations, and the premium is 7.5 percent using the Fama and French (1997) industry groupings, 6.0 percent using the Francis et al. (1999) industry groupings, and 4.9 percent using the Barth et al. (1998) industry groupings.

For model 2, the city leader in Table 4 has a premium of 12.86 percent. For the alternative industry definitions, the city leader coefficient in model 2 is significant at $p < .01$ in all three estimations, and the premium is 16.9 percent using the Fama and French (1997) industry groupings, 12 percent using the Francis et al. (1999) industry groupings, and 12.4 percent using the Barth et al. (1998) industry groupings.

For model 3, the joint national-city leader in Table 4 has a premium of 18.53 percent. For the alternative industry definitions, the joint national-city leader coefficient in model 3 is significant at $p < .01$ in all three estimations, and the premium is 21.9 percent using the French and Fama (1997) industry groupings, 17.7 percent using the Francis et al. (1999) industry groupings, and 16.6 percent using the Barth et al. (1998) industry groupings. In Table 4, for model 3 the city leader alone has a premium of 7.68 percent. For the alternative industry definitions, the city leader alone is significant at $p < .01$ in all three estimations, and the premium is 11.9 percent using the Fama and French (1997) industry groupings, 7.5 percent using the Francis et al. (1999) industry groupings, and 9.1 percent using the Barth et al. (1998) industry groupings. Finally, in Table 4 the national leader alone is insignificant at $p > .10$, and this is also the case for all three of the alternative industry definitions. We conclude that the results in Table 4 are robust to alternative industry groupings.

VI. OTHER ROBUSTNESS TESTS AND SPECIFICATION CHECKS

Model specification checks and other sensitivity analyses are reported in this section to examine the robustness of the study's primary results reported in Table 4. The results in Table 4 are supported in all of the tests except two sensitivity analyses pertaining to model 3 with respect to the premium for city-specific industry leaders that are not (also) national industry leaders.

Alternative Measure of Auditor Industry Leadership

We use first-time disclosures of actual audit fees in 2000 and 2001 to measure auditor industry shares and derive the top-ranked auditor per industry. However, actual audit fees were not publicly reported until proxy statement disclosures which began on February 5, 2001. This begs the question of how audit market participants in 2000 and 2001 would know the identity of industry audit fee leaders prior to the public disclosures. Since audit fees are positively correlated with auditee (client) size, it seems plausible that market participants could infer auditor industry leadership by observing auditor clienteles.

As a robustness check to our use of actual first-time audit fee disclosures to measure auditor industry leadership, we use prior-year client sales to estimate auditor industry market shares and leadership.[11] Models 1, 2, and 3 (from Table 4) are reported in Table 5 using this alternative estimation of industry leadership in lieu of the fee-based measures in Table 4.

The results of re-estimating the three models in Table 4 are robust to this alternative measurement of industry leadership except for one result in model 3 as noted below. For the re-estimation of model 1, the national leader coefficient is significant at $p < .01$ with a premium of 5.2 percent, and for model 2 the city leader coefficient is significant at $p < .01$ with premium of 5.8 percent, although these amounts are smaller than the corresponding fee premia of 7.8 percent and 12.9 percent in Table 4. For the re-estimation of model 3 the joint national-city leader coefficient is significant at $p < .01$ with a premium of 12.0 percent, although again this is lower than the premium of 18.5 percent in Table 4. Finally, both the city leader alone and the national leader alone are insignificant at $p > .10$ in the re-estimation. In contrast, in Table 4 the city leader alone in model 3 has a significant premium of 7.7 percent. We also used prior-year client assets to calculate auditor industry shares, and the coefficients and t-statistics on the auditor test variables are comparable to the above results using prior-year client sales, including insignificance of the coefficient for city leader (alone) in model 3.

Multiple Auditor Offices in a City

Big 5 accounting firms may have more than one practice office in metropolitan areas (cities) defined by MSA codes. If this is the case, there is a possible measurement error in office-level clienteles. Specifically we do not know if multiple offices within a single MSA are autonomous or if they are viewed as branches of one overarching office. To control for

[11] In addition, a referee points out that since audit fees are used as the study's dependent variable, and audit fees are also used to determine industry leadership, it is possible that coefficients on the auditor variables in Table 4 are upwardly biased if industry leadership is measured with error that is also correlated with audit fees. While there is no way of knowing if this is the case, the use of client sales to measure industry leadership avoids this econometric concern.

TABLE 5
Big 5 Audit Fee Models Where Industry Leadership Is Based on Clients' Prior Year Sales Revenue[a]
(Dependent variable is natural log of audit fees)

		National Industry Leadership Model 1			City Industry Leadership Model 2			Combined National and City Model Model 3		
Control Variables	**Exp. Sign**	**Estimate**	**t-statistic**	**Prob.**	**Estimate**	**t-statistic**	**Prob.**	**Estimate**	**t-statistic**	**Prob.**
Intercept		9.916	37.048	<0.001	10.362	89.912	<0.001	10.399	82.534	<0.001
LTA	+	0.433	60.989	<0.001	0.422	50.938	<0.001	0.421	50.573	<0.001
LSEG	+	0.215	14.484	<0.001	0.236	13.601	<0.001	0.239	13.732	<0.001
CATA	+	0.062	1.020	0.308	0.026	0.377	0.706	0.015	0.215	0.830
Quick	−	−0.005	−1.399	0.162	−0.004	−1.405	0.160	−0.004	−1.404	0.160
DE	+	0.107	2.392	0.017	0.090	1.449	0.147	0.088	1.416	0.157
ROI	−	−0.192	−4.887	<0.001	−0.215	−4.166	<0.001	−0.214	−4.172	<0.001
Foreign	+	0.628	13.769	<0.001	0.616	12.361	<0.001	0.613	12.337	<0.001
Opinion	+	0.199	7.837	<0.001	0.175	5.817	<0.001	0.173	5.765	<0.001
YE	−	−0.040	−2.077	0.038	−0.014	−0.631	0.528	−0.015	−0.699	0.485
Loss	+	0.067	2.835	0.005	0.022	0.757	0.449	0.021	0.722	0.470
Experimental Variables										
National Leader (Top Firm)		0.051	2.573	0.010						
City Leader (Top Firm)					0.056	2.641	0.008			
Both *National Leader* and *City Leader*								0.113	3.789	<0.001
National Leader but *not City Leader*								−0.011	−0.515	0.607
City Leader but *not National Leader*								0.013	0.338	0.735
F-statistic (p-value)			151 (<0.001)			133 (<0.001)			129 (<0.001)	
Adjusted R^2			0.738			0.738			0.738	
Sample size			3,838			2,902			2,902	

(*continued on next page*)

TABLE 5 (continued)

[a] Sample is Big 5 audited companies with audit fees reported by the client for the first time in 2000 or 2001. Industry leadership is defined as the top-ranked Big 5 firm based share of clients' prior year sales revenue within an industry (two-digit SIC). National industry leadership is based on national industry shares while city industry leadership is based on city-specific industry shares. Model 2 and model 3 samples are restricted at the city level to a minimum of two observations per industry. Industry fixed effects variables are not reported for brevity. All t-statistics are two-tailed p-values and based on the White (1980) heteroscedasticity corrected covariance matrix.

Control Variables:

LTA = natural log of total assets (in millions);
LSEG = natural log of the number of segments;
CATA = ratio of current assets to total assets;
Quick = ratio of current assets (less inventories) to current liabilities;
DE = ratio of long-term debt to total assets;
ROI = ratio of earnings before interest and tax to total assets;
Foreign = proportion of foreign sales;
Opinion = indicator variable, 1 = qualified audit report;
YE = indicator variable, 1 = non-December 31st year-end; and
Loss = indicator variable, 1 = loss in current fiscal year.

this possible measurement error, we re-estimate the models in Table 4 by deleting observations from potential MSAs with multiple auditor offices. To do this we examined the internet home page of PricewaterhouseCoopers, the largest U.S. accounting firm and the largest firm in our sample with 29 percent of total audit fees, to identify actual locations for their 92 U.S. offices. We identified 11 MSAs having two or more offices, and dropped all observations for all auditors in our sample from these 11 MSAs in order to increase the likelihood that remaining observations are single-office MSAs. This reduces the city sample size from 3,045 to 1,758 and we re-estimate models 2 and 3 using this reduced sample.[12] In model 2, the city leader coefficient is 0.120, the t-statistic p-value is $< .001$, and the premium is 12.7 percent. In model 3, the joint national-city leader coefficient is 0.191, the t-statistic is significant at $p = .001$, and the premium is 21.1 percent. The coefficient for the city leader (but not national leader) is 0.063, the t-statistic is significant at $p = .046$, and the premium is 6.5 percent. Finally, the national leader (but not city leader) is insignificant at $p > .10$. These results are comparable to those reported in Table 4 using the full sample, and indicate the full-sample results are robust to treating multiple offices within a MSA as if they are a single office.

Individual Auditors and Industries

To assure the results are not driven by individual accounting firms, the models in Table 4 are re-estimated dropping each of the accounting firms one at a time. For models 1, 2, and 3 the auditor coefficients that are significant in Table 4 are all significant at $p < .05$ with comparable coefficients when dropping each accounting firm one at time. We also dropped each of the 63 industries one at a time to assure the results in Table 4 are not driven by individual industries. Again, these results are qualitatively the same as those in Table 4 with respect to coefficients and t-statistics, and we conclude that the results are robust across the spectrum of industries in the sample and are not driven by individual industries.

Auditee Size

Craswell et al. (1995) report evidence that audit fee model parameters are sensitive to client size. To investigate this issue with respect to U.S. data we follow Craswell et al. (1995) and re-estimate the models in Table 4 separately for the upper and lower halves of the sample divided at the median value of total assets for the full sample of 3,994 observations.[13]

In model 1, for the larger clients the nationally top-ranked firm has a significant premium of 11 percent ($p < 0.001$), while for smaller clients there is no premium for the top-ranked firm ($p = 0.323$). This result is consistent with Craswell et al. (1995) who find that the premium for industry leadership in Australia is driven by the upper half of company size in their sample. In model 2, the city leader has a significant fee premium of 14 percent ($p < 0.001$) for larger clients, and a premium of 7 percent ($p = 0.007$) for smaller clients. In model 3, auditors which are *both* national and city leaders have a fee premium of

[12] The large reduction in sample size is due to the exclusion of some of the largest metropolitan areas in the United States. The 11 MSAs deleted for this analysis are Boston-Cambridge, Dallas-Fort Worth, Detroit-Bloomfield Hills, Indianapolis, Los Angeles-Century City-Irvine, Miami-Fort Lauderdale, New York City-Florham-Jersey City-Melville-Ridgewood-Stamford, Salt Lake City-Ogden, San Francisco-Menlo Park, Tampa (FL), and Washington, D.C.-Baltimore-Mclean.

[13] As an alternative test, we created a set of nine intercept terms coded 1 if an observation is in the second through tenth deciles of client size, respectively, measured by total assets (the first decile is the default intercept). The three models in Table 4 have comparable coefficients and t-statistics on the auditor test variables using this additional control for client size differences (in addition to inclusion of a control variable for log of assets).

22 percent ($p < 0.001$) for larger clients, and a premium of 7 percent ($p = 0.06$) for smaller clients. Auditors that are city but not national leaders have a marginally significant fee premium of 5 percent ($p = 0.11$) for larger clients, and a premium of 7 percent ($p = 0.05$) for smaller clients. Auditors that are national but not city leaders are insignificant at $p > .10$ in both halves of the sample. In addition the intercepts for each subsample are approximately the same, which reduces the likelihood of scale-related coefficient bias arising from company size differences (Barth and Kallapur 1996).

We conclude from this analysis that the results in Table 4 are generally consistent for the upper and lower halves of firm size in the sample. In particular, model 3 has consistent statistical inferences on the auditor test variables, with the main difference being that the magnitude of the premium for joint national-city leadership is bigger for larger clients (22 percent) than for smaller clients (seven percent).

Nonaudit Fees

Whisenant et al. (2003) use a simultaneous equations methodology and find that audit fees and nonaudit fees are independent of one another after controlling for the simultaneous (joint) determination of audit fees and nonaudit fees. If this result generalizes beyond their sample and methodology, then the level of nonaudit fees would not be a correlated omitted variable in a single-equation audit fee model like the one we estimate in Table 4. However, since many prior studies do document a positive correlation between audit and nonaudit fees, we re-estimate the models in Table 4 with an additional control variable for nonaudit fees (natural log). As in prior studies, there is a positive and significant association ($p < .001$) between audit fees and nonaudit fees. Inferences on the auditor indicator variables in Table 4 are qualitatively unchanged with this additional control variable. The auditor coefficients that are significant in Table 4 are significant at $p < .05$ when nonaudit fees are added to model. The premiums for industry leadership are 7 percent in model 1, 12 percent in model 2, and for model 3, the joint national-city leader has a premium of 18 percent, the city leader alone has a premium of 8 percent, and the national leader alone is insignificant at $p > .10$. We conclude that the model specification in Table 4 is robust to the inclusion or exclusion of a variable for nonaudit fees.

Restricted City Sample

We examine a restricted city sample to investigate a subsample of larger industries and larger city-specific audit markets where auditor industry expertise may be more likely to exist because of larger clienteles. The trade-off is that by limiting the number of cities and industries the generality is limited and statistical power of the tests may be reduced. Screens for the restricted sample are the same as the full-city sample plus the following two additional screens: we exclude all industries with less than 25 total observations ($n = 350$), and we exclude those unique city-industry combinations with fewer than five observations ($n = 1,315$). The restricted city sample consists of 2,157 observations in 24 different industries and 31 different cities, and representing 139 unique city-industry combinations and an average of 16 observations per unique city-industry combination. In contrast, the full-city sample has 3,045 observations in 52 different industries and 77 different cities, 481 unique city-industry combinations and an average of six observations per unique city-industry combination.

Results for the restricted city sample are qualitatively the same as Table 4 with one exception in model 3. In model 1, the nationally top-ranked firm earns a premium of 9.53 percent relative to other Big 5 auditors (compared to 7.79 percent in Table 4). In model 2, the city leader earns a premium of 9.97 percent relative to other Big 5 firms (compared to

12.86 percent in Table 4). The results of model 3 are as follows. Observations in which auditors are *both* national and city leaders have a premium of 17.82 percent relative to nonleaders, compared to a premium of 18.53 percent for the full city sample in Table 4. However, there is no fee premia for firms that are a national leader but *not* the city leader, or firms that are a city leader but *not* the national leader. So the only substantive difference between the full sample in Table 4 and restricted city sample analysis is that the city-only industry leader coefficient in model 3 is significant in Table 4 but is insignificant in the restricted sample.

VII. CONCLUSION

The purpose of this study is to use the new U.S. fee disclosures to investigate audit pricing in the U.S. audit market, and in particular to determine if Big 5 accounting firms have reputations for industry expertise that are priced in the audit market. Using the joint national and city framework developed by Ferguson et al. (2003) we find that Big 5 audits are priced as if industry expertise exists and is valued by clients. Our findings give credence to the use of industry leadership based on audit fee market share data to measure an auditor's reputation for industry expertise, and indicate that an auditor's reputation is priced as if *both* firm-wide (national) and city-specific (local) reputations are jointly relevant. Specifically, there are consistent audit fee premia of approximately 19 percent when auditors are *both* national industry leaders and city-specific industry leaders. However, national industry leadership alone, without being a city-specific industry leader, *never* results in a fee premium.

The fact that national leadership (alone) carries no premium is evidence against the existence of "strong" reputation effects arising from the transferability of office-specific expertise. However, the finding that fee premia exist when auditors are jointly national and city leaders is evidence of at least "weak" firm-wide reputation effects. Thus auditor reputation for industry expertise is neither strictly national nor strictly local in character. Rather, auditor industry expertise appears to be most credible to the audit market when the firm is jointly the national leader and city-specific industry leader, indicating there is both a national and local-office dimension to reputation and the pricing of industry expertise.

The audit fee premia documented in this study provide evidence of differentiation among Big 5 auditors based on the joint effects of national industry leadership and city-specific industry leadership. Since higher audit fees for joint national-city industry leaders imply audit quality differences, future research on audit quality may benefit by taking into consideration both the national and city-specific dimensions of auditor reputations identified in this study.

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