The Concentration of Local Markets: A Study of Accounting, Advertising and Law

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SYNOPSIS: Published market concentration statistics have aroused concerns that industry leaders may have monopolized the U.S. accounting market. Using the law and advertising service industries as benchmarks, this paper analyzes local (single Metropolitan Statistical Area) concentration measures. Consistent with national measures, the average local concentration measures indicate that accounting is statistically more concentrated than law or advertising. However, the relative difference between accounting and the benchmark advertising and law concentration measures declines considerably as one moves from the national to the local level. Moreover, accounting is statistically more concentrated than law or advertising only in the largest local markets; concentration measures of the three service industries are not statistically different in smaller local markets. These results are consistent with large discretionary expenditures (e.g., training, research and development, advertising) in accounting relative to advertising or law. Our findings suggest that, in smaller local markets, accounting is not more prone to collusion than other professional services. The results also suggest an important difference in the market structure of accounting and other service industries.

Data Availability: Data used in this study are available from the authors.

I. INTRODUCTION

Regulators and others have expressed concern that the apparent domination of the accounting profession by a small number of firms might lead to tacit collusion in pricing and market decisions among the industry leaders. Using the law and advertising industries as benchmarks, this paper investigates differences in local market concentrations in order to address the concern that the market for accounting services is too concentrated. Consistent with national concentration measures, we find that accounting is significantly more concentrated at the local level than law or advertising. However, the relative differences in market concentration for the accounting, law and advertising industries decline considerably when concentration is measured at the local level rather than at the national level.

Our results also show that the largest markets drive the significant differences in concentration across the three industries; accounting is statistically more concentrated than law or advertising only in the largest local markets. Based on the *concentration-collusion* doctrine, these findings suggest that accounting may be no more prone to collusion in smaller local markets than are other similar professional services.

We then explore why concentration may differ in markets of different sizes. The indus-

trial organization literature predicts that the relation between concentration and market size depends on the relative magnitudes of discretionary and non-discretionary costs. We find a significant positive relation between local market concentration and local market size for accounting, which is consistent with market leaders in the largest markets incurring large discretionary sunk costs. Large expenditures on discretionary items, such as training, research and development or advertising, help market leaders to obtain a competitive advantage over smaller competitors through either increasing consumers' willingness-to-pay for products or decreasing the average cost of providing services. Increasing returns to scale would make these expenditures most effective in large markets. In contrast, we find a significant negative relation between local market concentration and local market size for the law profession. This finding is consistent with evidence that the law firms do not incur large discretionary expenditures. The local market concentration-market size relation is insignificantly negative for the advertising profession. These results suggest an important difference in the market structure of accounting and other service industries.

The remainder of the paper is organized as follows. The next section outlines prior research on market concentration and regulatory concerns. Section III discusses how discretionary costs may affect the relation between (local) market concentration and market size. A description of the data appears in section IV, followed by a discussion of the concentration measures used in this study. Section VI presents our findings. The final section provides our conclusions and caveats.

II. MARKET CONCENTRATION AND REGULATORY CONCERNS

Accounting firms have a higher U.S. national market concentration than do other major professions, such as law or advertising (Galanter and Palay 1991). The U.S. Department of Commerce's 1987 Census of Service Industries (table 6a, April 1990) provides the following national market concentrations for accounting, law and advertising service industries:[1]

	Percentage of All Revenues Earned by the Top Four Firms	Percentage of All Paid Employees Employed by the Top Four Firms	Percentage of All Annual Payroll Paid by the Top Four Firms
Accounting	18.2%	11.9%	17.5%
Law	1.5	0.8	1.1
Advertising	9.3	8.2	10.9

These concentration ratio percentages, which represent the market share of the largest four firms in each service industry, are referred to as CR4 measures. They are defined as the total measure of activity (revenues, paid employees or annual payroll) for the top four members, divided by the total measure of market activity for all members of the service industry.[2] Note that all measures indicate a higher market concentration for accounting relative to the other professions.[3]

Appealing to the *concentration-collusion* doctrine, this level of concentration is often cited in calls for regulation of the accounting industry.[4] For example, the 1976 U.S. Senate subcommittee report on the "Accounting Establishment" (1976, 7) contends that for the accounting industry (dominated by the then "Big 8"):

> Excessive market concentration traditionally causes problems concerning the price and availability of goods and services. The concentration of major corporations as clients of the "Big Eight" indicates a need for an investigation of possible anti-competitive effects.

While the *concentration-collusion* doctrine has been challenged by some economists, it remains the cornerstone of regulatory agencies'

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[1] Ideally, we would like national market concentration figures for the same year we calculate local measures (1990). However, the Census of Service Industries is conducted only every five years with a reporting lag of several years (three for 1987) for aggregated national figures.

[2] In calculating the CR4 measures, the measure of market size determines the largest four firms in the industry. Therefore, the identity of the largest four firms can differ across market size measures.

[3] The concentration measures using the largest eight (rather than four) firms also suggest that the accounting service industry is more concentrated than advertising or law at the national level.

[4] The *concentration-collusion* doctrine assumes that interdependence in pricing and other decisions among firms with large market shares is recognized and taken into account differently than where there are many firms with small market shares (Brozen 1982).

antitrust policy (Brozen 1982; Baker and Breshnahan 1992). Regulators are concerned that concentration may lead to tacit collusion among large firms in pricing, dividing up the market and establishing barriers to entry.

Previous accounting studies concerning market structure have generally examined aggregate statistics such as national firm revenues and computed various concentration measures. For example, Tomczyk and Read (1989) use audit revenues to compute concentration measures and conclude that the level of concentration of the U.S. audit market is high. Rather than relying exclusively on concentration measures, another approach is to identify alternative measures for the degree of competition. For example, Simunic (1980) argues that high concentration statistics do not necessarily evidence a lack of competition in the market for audit services. He examines audit fees, and concludes that the then "Big 8" accounting firms do not monopolize the market for audit services. Our study extends the previous literature in two ways. First, we examine whether local concentration measures are consistent with those based on national measures. Because "goods" within accounting, law and advertising service industries are less transportable than other industries such as manufacturing, local markets appear to be the appropriate level of analysis.[5] If local level measures of concentration in the accounting industry indicate considerably less concentration relative to other service industries, regulatory concerns may be unwarranted.

Second, we evaluate accounting market concentration against an objective benchmark: the concentration of other service industries. The benchmark service industries of law and advertising are characterized by organizational forms, work environments and tasks which are similar to those in accounting (Abbott 1988; Galanter and Palay 1991). If local concentration measures for accounting approximate the local concentration measures for law or advertising, the *concentration-collusion* doctrine suggests that accounting is no more prone to collusion than are other similar professional services—at least at the local level.

III. DISCRETIONARY COSTS

While our analysis focuses on the regulatory issues raised above, we also examine the relation between local market concentration and local market size. An observed difference in this relation among service industries may suggest differences in their market structures. The industrial organization literature suggests that such a difference may be due to the nature of costs incurred by the market participants. Sutton (1991, 7–12) predicts that the market size-market concentration relation depends on the relative level of discretionary and non-discretionary expenditures. Non-discretionary costs are necessary to maintain the firm's membership in the service industry, and consequently do not differ considerably across firms (e.g., the cost of maintaining standard office space, administrative support and costs of maintaining credentials). When sunk costs are primarily non-discretionary, Sutton (1991, 9) predicts a negative relation between market size and market concentration: a firm will enter the market as long as its profitability before sunk costs is matched by the required level of non-discretionary sunk costs. As that market becomes larger, the number of firms that find membership profitable will increase because there are more available profits to be shared, and the concentration measure will decline as a result.

In contrast, the negative market size-market concentration relation may break down and even reverse when sunk costs are discretionary. Discretionary expenditures, such as advertising, training and research and development, create a competitive advantage by either increasing a consumer's willingness-to-pay for a product or creating economies of scale (see Sutton 1991, 11; Scherer and Ross 1990, 97).[6] Discretionary expenditures typi-

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[5] Regulatory concerns at the local level are not without precedent. For example, application of the *concentration-collusion* doctrine by the Federal Reserve has resulted in an antitrust policy that seeks to deter undue concentration as it applies to *local* markets (see Hannan 1991).

[6] Scherer and Ross (1990, 97–98) use specialization of labor and equipment to illustrate economies of scale. Large firms may also be able to exploit economies of scope, where production of one product (e.g., audit ser-

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cally require a minimum market share before they become profitable (Sutton 1991, 61).[7] However, in larger markets, a small number of firms may be able to preempt entry by making large discretionary expenditures (Sutton 1991, 67).[8] If greater market size makes it more likely that preemptive expenditures will be profitable, there may be a positive relation between market size and concentration.[9]

IV. DATA

Concentration ratios have been based on various measures of size, such as sales, output, assets or employment (Rutherford 1992; Scherer 1980). We use employment data to compute concentration measures since this is the only measure of size which is consistently available for all local markets. We consider a local market to be a metropolitan statistical area (MSA). Local concentration measures are more appropriate for the service industry since "goods" in this industry are not as easily transportable as tangible goods.

The numbers of professionals, full-time employees and attorneys were collected for the accounting, advertising and law offices respectively in 49 of the (target) 60 largest U.S. MSAs.[10,11] To obtain these data, we contacted business periodicals such as *Baltimore Business Journal*, *Crain's Chicago Business* and *Pittsburgh Business Times* which publish lists of the largest firms in various businesses.[12] All of the lists obtained were published during (approximately) the 1990 calendar year.[13] The data covering the 49 MSAs provide information on 1,110 accounting, 1,170 law and 1,142 advertising offices. The appendix lists the business periodicals used in this study.

V. CONCENTRATION MEASURES

To calculate concentration measures, we ranked the firms within each service industry and each MSA from largest to smallest based on the number of professionals, full-time employees or attorneys. Since theory does not identify a superior concentration measure, we use multiple concentration measures to assess the robustness of our inferences (Scherer and Ross 1990, 422). For each MSA and each service industry, we calculate two main measures

of concentration, the CR4 and the Herfindahl Index.

First, CRn is defined as the ratio of total size of the top n firms divided by total size of the entire market:

$$CRn = \sum_{i=1}^{n} s_i \bigg/ S \qquad (1)$$

Footnote 6 (Continued)

vices) reduces the costs of producing another product (e.g., management advisory services). Like economies of scale, economies of scope permit firms to be more competitive.

[7] Economists frequently argue that specialization of labor is limited by the size of the market (see Becker and Murphy 1992, 1147-1148).

[8] In theory, this argument could lead to a single firm serving an entire market (Sutton 1991, 66-67). Empirically, we do not observe one firm serving a given market. Possible explanations of why one large firm does not monopolize a market are: (1) the benefits of discretionary expenditures level off after some point; and (2) customers that compete against each other may prefer to not be serviced by the same firm.

[9] It is possible that increases in market size are not accompanied by increases in concentration (Sutton 1991, 67-68). Intuitively, this situation would occur when the benefit of discretionary expenditures is very small.

[10] The business periodicals typically list the top 25 firms within that profession in that area. All data given were used, with the exception of one MSA. The lists from MSA #2 report the largest 50 accounting, 50 advertising and 100 law firms. These lists were truncated to include only the top 25 firms in each profession for comparability across MSAs. The number of firms for each MSA range from 10 to 27, with a median of 25.

[11] The number of professionals was not available for the accounting firms in 12 MSAs; these MSAs provided the total number of employees only. To estimate the number of professionals for the offices in these MSAs, we regressed the number of professionals on the number of total employees using data from all MSAs that provided these two figures for the accounting profession. We used the estimated coefficients from this regression (a = –0.7003 (t-statistic = –0.8675), b = 0.8059 (t-statistic = 209.3672); Adjusted R^2 = 98.75%) to calculate the estimated number of professionals in these 12 MSAs.

For three MSAs, the number of attorneys was not directly provided. This figure was obtained by summing the number of partners and the number of associates for these three MSAs.

[12] Using the top 60 MSAs as our target, we attempted to determine whether business journals/periodicals existed for each area, and if they did, whether lists were published (e.g., calls to local Chambers of Commerce, with follow-up calls to any publisher identified).

[13] All lists reflected the Ernst & Whinney/Arthur Young and Deloitte Haskins & Sells/Touche Ross mergers. Deloitte & Touche was formed in December 1989; and Ernst & Young was formed in October 1989.

where N = the total number of firms listed in the business periodical

s_i = the size of firm i (the firms are ordered such that $s_1 > s_2 > ... > s_N$)

i = size rank (i = 1 and i = N being the index of the largest and firms smallest respectively)

S = the total size of the market ($\sum_{i=1}^{N} s_i$).

Because the CR4 ratio is probably the most common concentration ratio, we focus on this measure, which represents the largest four firms' percentage of the total market. Results (not reported) using n = 8, 12 or 16 are consistent with the findings discussed below.

A related measure, the Herfindahl Index (H), is also computed for each MSA and for each service industry. This measure is the sum of the squares of the ratios of each firm's size to the total size of the market. Using the notation introduced above:

$$H = \sum_{i=1}^{N} \left[s_i / S \right]^2 \qquad (2)$$

H can take values between 1 (only one firm on the list) and 1/N (all listed firms are the same size). Consistent with the CR4 measure, higher values of H indicate a higher level of concentration. In general, CR4 and H are highly correlated; Nelson (1963) found that the correlation between CR4 and H was +0.936 in a study of 91 industries.[14,15]

VI. RESULTS

Table 1 presents the two concentration measures, CR4 and the Herfindahl Index, for each MSA and for each service industry. The average CR4 measure indicates that the accounting service industry is the most concentrated of the three service industries, followed by advertising and law (averages: 0.5272 > 0.4538 > 0.3925). The Herfindahl Index yields similar inferences.[16]

Table 2 reports results of a test of the hypothesis that concentration differs significantly across the three service industries.[17] The nonparametric Fisher sign test compares concentration measures (CR4 or H) for matched pairs of professions for each MSA. We tabulate the number of times that the con-

centration measure is greater for one service industry versus another, across all MSAs. Results based on all MSAs (panel A) indicate that the accounting profession is more highly concentrated than the advertising profession (p < 0.0328). The accounting profession is also more concentrated than the law profession (p < 0.0000). The results in panel A indicate that the accounting service industry is significantly more concentrated than either the advertising or law service industries at a local market level. This conclusion is consistent with previously reported findings measured at a national market level.

In our sample, the differences in the average and median concentration measures do not appear great across service industries, although they are statistically significant. In fact, the relative differences in concentration between service industries decline when moving from the national to the local level. For example, the ratio of the CR4 measure for accounting to the CR4 measure for law is 14.9

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[14] Minyard and Tabor (1991) provide various arguments for the superiority of H to CRn. However, the high degree of correlation between the two measures as evidenced by previous studies (and our own) indicates that they are similar.

[15] A major problem with H and CRn is that they require size measures for all firms in the market. However, we only have access to data from the top N (typically 25) largest firms. Because the omission of these smaller firms from the calculation can overstate the concentration measure, researchers typically try to gain some assurance that the unmeasured segment of the market is immaterial. This measurement problem can be addressed in two ways. First, if the benchmark applied to accounting concentration ratios consists of concentration ratios calculated for other professions with similar data constraints (advertising and law), the implicit matching may improve the ability to make inferences. Second, as a robustness check, we calculate another metric, the "beta coefficient," which does not require size measures for all firms in the market (Ijiri and Simon 1971, 1977). The beta coefficient only requires data for the largest firms since the beta measure permits an extrapolation down the size-rank to size curve. The results based on the beta coefficient are qualitatively similar to those presented here.

[16] The correlations between CR4 and H for the accounting, advertising and law professions are +0.96, +0.91 and +0.92 respectively, indicating that they are almost identical measures. The high correlations between the measures suggest that they capture the same underlying construct (see also Nelson 1963).

[17] A paired-comparison t-test yields similar conclusions.

TABLE 1
Local Concentration Measures in Accounting, Advertising and Law
by Metropolitan Statistical Area (MSA) in 1990[1]

MSA	CR4			H		
	Accounting	Advertising	Law	Accounting	Advertising	Law
1	0.5776	0.4006	0.2386	0.1060	0.0670	0.0429
2	0.5731	0.3109	0.3023	0.1082	0.0502	0.0476
3	0.5022	0.6043	0.2546	0.0875	0.1663	0.0444
4	0.6450	0.4436	0.3255	0.1223	0.0790	0.0523
5	0.5458	0.4643	0.2718	0.0948	0.0817	0.0476
6	0.5636	0.5369	0.3681	0.1020	0.0981	0.0574
7	0.5824	0.5400	0.3143	0.1143	0.1038	0.0498
8	0.6419	0.6621	0.2860	0.1298	0.1357	0.0499
9	0.5837	0.4039	0.2588	0.1070	0.0790	0.0445
10	0.6553	0.4419	0.4533	0.1477	0.0718	0.0716
11	0.4857	0.2292	0.2951	0.0862	0.0321	0.0479
12	0.5683	0.3989	0.3736	0.1115	0.0674	0.0602
13	0.6287	0.2621	0.3566	0.1268	0.0333	0.0556
14	0.5274		0.3614	0.0898		0.0633
15	0.5429	0.4813	0.3450	0.0906	0.0812	0.0549
16	0.5044	0.5475	0.3291	0.0882	0.1146	0.0531
17	0.4426	0.3832	0.3705	0.0721	0.0643	0.0614
18	0.3752	0.4129	0.4516	0.0582	0.0695	0.0771
19	0.5103	0.5822	0.4567	0.0911	0.1321	0.0704
20	0.4831	0.3174	0.4051	0.0850	0.0542	0.0706
21	0.6430	0.3165	0.3317	0.1316	0.0399	0.0455
22	0.5461	0.3394	0.4223	0.0989	0.0564	0.0639
23	0.5463	0.4429	0.4867	0.0998	0.0727	0.0829
24	0.5142	0.5018	0.3149	0.0902	0.0906	0.0530
25	0.5249	0.3943	0.4639	0.0983	0.0649	0.0763
26	0.4691	0.3473	0.4113	0.0775	0.0564	0.0658
27	0.4732	0.3898	0.3297	0.0799	0.0660	0.0550
29	0.5709	0.4401	0.4354	0.1001	0.0749	0.0729
30	0.5053	0.5312	0.3736	0.0977	0.0881	0.0582
31	0.5743	0.4444	0.3202	0.1056	0.0748	0.0507
32	0.4425	0.3503	0.4652	0.0771	0.0534	0.0737
33	0.4038	0.4208	0.4039	0.0657	0.0730	0.0637
34			0.4443			0.1223
35	0.5494		0.4009	0.1009		0.0642
38	0.4359	0.4714	0.5000	0.0739	0.0858	0.0865
39	0.3909	0.3320	0.3780	0.0637	0.0466	0.0639
40	0.5517	0.4806	0.3761	0.1014	0.0884	0.0657
41	0.5016	0.4667	0.3601	0.0872	0.0833	0.0614
42	0.5177	0.4369	0.4783	0.0877	0.0727	0.0821
43	0.4514		0.3677	0.0757		0.0567
44	0.6259	0.6568	0.5465	0.1398	0.1376	0.1062
45	0.4465	0.6290	0.5285	0.0807	0.1710	0.0999
46	0.6065		0.5759	0.1322		0.1169
47	0.4486	0.6436	0.3546	0.0676	0.1854	0.0557
48	0.4593	0.4661	0.2549	0.0769	0.0793	0.0458
52	0.6239	0.7019	0.4352	0.1247	0.2575	0.0777

TABLE 1 (Continued)

MSA	CR4			H		
	Accounting	Advertising	Law	Accounting	Advertising	Law
57	0.5874	0.4256	0.5719	0.1186	0.0696	0.1146
58	0.4095	0.4603	0.4303	0.0698	0.1010	0.0683
60	0.5460		0.6532	0.1044		0.1351
Average	0.5272	0.4538	0.3925	0.0968	0.0877	0.0675
Median	0.5352	0.4429	0.3736	0.0963	0.0749	0.0633
Std. Dev.	0.0724	0.1098	0.0914	0.0212	0.0439	0.0216
Minimum	0.3752	0.2292	0.2386	0.0582	0.0321	0.0429
Maximum	0.6553	0.7019	0.6532	0.1477	0.2575	0.1351

[1] These concentration measures are based on employment data. For each MSA and each profession, the firms are ranked from largest to smallest. To calculate the largest four firms' percentage of the total market (CR4), the total number of employees of the top four firms is divided by the total number of employees for all firms in that MSA. The Herfindahl Index (H) is computed by summing the squares of the ratios of each firm's number of employees to the total number of employees in the market.

at the national level, but only 1.3 at the local level. This finding suggests that the differences in concentration among the three service industries may not hold in all local markets.

To explore the relation between relative concentration ratios and MSA size, we calculate the sign test using the 15 largest and 15 smallest MSA observations.[18] Panel B of table 2 presents the results based on the largest 15 MSA observations. The significant differences found for all MSAs in panel A continue to hold for the 15 largest MSA observations in panel B. In contrast, panel C shows that for the 15 smallest MSA observations, the concentration measures are not statistically different. Therefore, the largest MSAs are driving the overall differences in concentration between the three service industries. In conclusion, while accounting may be more concentrated on average at a local level than the other service industries, this result is driven by the largest local markets.

The Relation Between Market Size and Market Concentration

The results in table 2 suggest that the relation between local market size and local market concentration likely differs among the accounting, law and advertising industries. As discussed in section III, Sutton (1991, 7–12) argues that discretionary expenditures can affect the relation between market size and market concentration. Empirical and anecdotal evidence (see below) suggests that the level of discretionary expenditures may differ across the three service industries; therefore, we examine the Spearman rank correlations between concentration measures and MSA size (table 3).

For the law industry, the rank correlation between concentration and market size is negative and significant. According to Sutton (1991), this finding is consistent with law firms incurring primarily non-discretionary costs. In the law profession, industry members incur an initial cost of education and meeting state licensure requirements. Although most states require continuing education to maintain professional licensure, only 11 percent (14 percent) of attorneys reported that they engaged in formal (informal) company training to improve their skills in 1991 (U.S. Department of Labor's *How Workers Get Their Training: A 1991 Update*, table A-2). Further, networking, which may result in economies of scale, is not widespread in the law profession due to a general lack of inter-

[18] Due to missing data, the 15 largest and smallest observations do not correspond to MSAs 1–15 and MSAs 45–60. We do not calculate the sign test using data from MSAs 1–15 and MSAs 45–60 since the two sample sizes differ greatly.

TABLE 2
Sign Test for Differences in Local Concentration Measures Between Pairs of Professions[1]

	CR4			H		
	Acct.>Adv.	Acct.>Law	Adv.>Law	Acct.>Adv.	Acct.>Law	Adv.>Law
Panel A: All MSAs						
Frequency	29	41	28	30	43	29
Total cases	43	48	43	43	48	43
Percentage	67.44	85.42	65.12	69.77	89.58	67.44
Two-tailed probability	0.0328	0.0000	0.0673	0.0147	0.0000	0.0328
Panel B: Largest 15 MSAs						
Frequency	12	15	12	12	15	13
Total cases	15	15	15	15	15	15
Percentage	80.00	100.00	80.00	80.00	100.00	86.67
Two-tailed probability	0.0352	0.0001	0.0352	0.0352	0.0001	0.0074
Panel C: Smallest 15 MSAs						
Frequency	7	11	10	8	11	10
Total cases	15	15	15	15	15	15
Percentage	46.67	73.33	66.67	53.33	73.33	66.67
Two-tailed probability	1.0000	0.1185	0.3018	1.0000	0.1185	0.3018

[1] The sign test uses matched pairs of the same concentration measure for the same MSA. The sign test computes the number of times that a given concentration measure is greater for one profession versus another across MSAs. Panel A provides the results for the entire sample of MSAs, whereas panels B and C present the results for the largest and smallest 15 MSA observations respectively. CR4 equals the largest four firms' percentage of the market, whereas H refers to the Herfindahl Index.

TABLE 3
Spearman Rank Correlations Between Local Concentration Measures and Local Market Size[1]

	Accounting[2]	Advertising	Law
Correlation (CR4, Size)	0.3130 (0.0304)	–0.1895 (0.2236)	–0.5427 (0.0000)
Correlation (H, Size)	0.2651 (0.0686)	–0.1990 (0.2008)	–0.5572 (0.0000)

[1] To compute these correlations, the concentration measure and the size of the MSA are separately ranked. The figures given in the table represent the correlation between these two sets of rankings. CR4 equals the largest four firms' percentage of the market, whereas H refers to the Herfindahl Index.
[2] Two-tailed probability values are given in parentheses.

state reciprocity of licensure requirements.[19] Historically, the American Bar Association has severely limited advertising and solicitation.[20] The negative rank correlation is consistent with the characterization of the law profession as an industry with predominantly non-discretionary sunk costs.

In contrast, using Sutton's (1991) framework, the positive rank correlation between market size and market concentration for accounting suggests that accounting firms incur large expenditures on discretionary items. Large accounting firms' extensive networks probably create economies of scale in advertising and manpower development.[21] In 1991, the accounting profession had the seventh (ninth) largest number of workers who took formal (informal) company training to increase their skills for their current jobs.[22] The percentage of employees who participated in formal company training in 1991 was over twice as high in the accounting industry (23 percent) as in the law industry. Additionally, the accounting industry spent $64 million on advertising.[23] The positive correlation between market size and market concentration is consistent with accounting firms having large discretionary expenditures.

The empirical results indicate an insignificant negative relation between local concentration and local market size for advertising. The advertising industry spent a total of $83 million in 1987 on self-promotional activities (U.S. Department of Commerce's 1987 Census of Service Industries, table 8). However, only 16 percent of employees reported participating in formal company training in 1991 (U.S. Department of Labor's *How Workers Get Their Training: A 1991 Update*, table A-2). This finding suggests that firms in the advertising profession may incur both discretionary and non-discretionary expenditures.

Overall, these results are consistent with the presence of large discretionary expenditures in the accounting service industry, but not in the law or advertising industries. More importantly, the relation between market size and market concentration systematically differs across the three industries. These results are consistent with those presented in panels B and C of table 2.

VII. DISCUSSION AND CONCLUSIONS

This paper presents descriptive evidence on the level of local market concentration for the accounting, advertising and law service industries. Local concentration measures may be more appropriate than the previously documented national concentration measures since the availability of services depends on the location of personnel. The advertising and law concentration measures provide objective benchmarks for evaluating the concentration of the accounting service industry.

The main results suggest that the relative differences in market concentration between the service industries are less pronounced when concentration is measured at a local level versus the national level. On average, accounting is more concentrated than either advertising or law, even in local markets. However, the largest markets drive this result. For smaller markets, there are no significant differences in concentration between professions. Based on the *concentration-collusion* doctrine, these findings suggest that in smaller local markets, accounting may be no more prone to collusion than other professions.

Additional tests show that as the market size increases, the accounting service industry becomes more concentrated whereas the

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[19] Only four states have provisions for automatic reciprocity, whereas 16 states require all applicants to retake the bar exam regardless of length of practice in any other jurisdiction (*BAR / BRI Digest* 1993, 48).

[20] Although these restraints have been relaxed in recent years, lawyers continue to be reluctant to engage in self-promotional activities (Abel 1989, 122). The 1987 Census of Service Industries does not report the amount that the law profession spent on advertising.

[21] In comparing law and accounting firms, Galanter and Palay (1991, 122) note large accounting firms' "coverage-driven push to greater size, more locations and a greater range of services."

[22] U.S. Department of Labor's *How Workers Get Their Training: A 1991 Update*, tables 63 and 66. To further illustrate the large expenditures accounting firms incur for training, Arthur Andersen spent $300 million in staff training costs for 1990. The consulting division of Arthur Andersen reportedly spent more than $10 million a year for advertising in 1990 (Pickering and Telberg 1991, S16-S17).

[23] U.S. Department of Commerce's 1987 Census of Service Industries (1990, table 8).

law industry becomes less concentrated. These results are consistent with accounting firms using discretionary expenditures to obtain a competitive advantage in large local markets. The negative relation between local market concentration and local market size in the law industry is consistent with lower levels of discretionary sunk costs.

A motivation for our study is regulators' concern about the high level of concentration in the accounting industry. However, our study does not directly address concerns about the concentration of *audit* markets since we use measures related to the activities of the entire accounting firm.[24] The use of audit fees alone, however, may present an incomplete picture of market concentration. Leibman and Kelly (1992) assert that many accounting firms have shifted resources to tax and management advisory services (MAS). To market these generally more profitable services to clients, an entree through an audit engagement is useful. Auditing services thereby become a highly competitive loss leader for many accounting firms. If one views the accounting firm as selling a bundle of services to each client, consisting not only of audit services, but also of tax services and MAS, the measures we calculate represent valid measures of concentration.

Another caveat concerns our focus on local markets to investigate concentration. Since the national offices of large accounting firms can coordinate strategies, it may be difficult to interpret local market concentration results for firms which focus on the national level (e.g., firms with an objective of maximizing national profits). However, if national firms tacitly collude at the head office, this activity (e.g., dividing up local markets) would lead to more concentrated local markets than service industries in which tacit collusion at the national level is not possible. In addition, evidence suggests that large accounting firms are decentralized (see Trompeter 1994). Therefore, we argue that local concentration measures are appropriate even for national accounting firms. Our results based on local concentration measures provide evidence for less regulatory concern.

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[24] To investigate the concentration of only the audit market, the measures would be calculated with audit fees or revenues. Previous studies have used various *estimates* of audit fees (e.g., Eichenseher and Danos 1981; Danos and Eichenseher 1982, 1986; Minyard and Tabor 1991). However, these data are generally not available, especially for local markets. The only data that are consistently available for this study are the total number of employees of the firm.

APPENDIX
The Business Periodical Sample

Metropolitan Statistical Area	1988 Population millions[1]	Publication
1. New York/NJ/Long Island	18.12	*Crain's New York City Business*
2. Los Angeles/Anaheim/Riverside	13.77	*Los Angeles Business Journal*
3. Chicago/Gary/Lake County	8.18	*Crain's Chicago Business*
4. San Francisco/Oakland/San Jose	6.04	*S.F. Business Times*
5. Philadelphia/Wilmington/Trenton	5.96	*Philadelphia Business Journal*
6. Detroit/Ann Arbor	4.62	*Crain's Detroit*
7. Boston/Lawrence/Salem	4.11	*The Boston Business Journal*
8. Dallas/Fort Worth	3.77	*Dallas Business Journal / The Business Press*
9. Washington	3.73	*Washington Business Journal*
10. Houston/Galveston/Brazoria	3.64	*Houston Business Journal*

11.	Miami/Fort Lauderdale	3.00	*South Florida Business Journal*
12.	Cleveland/Akron/Lorain	2.77	*Crain's Cleveland Business*
13.	Atlanta	2.74	*Atlanta Business Chronicle*
14.	St. Louis	2.47	*St. Louis Business Journal*
15.	Seattle/Tacoma.	2.42	*Puget Sound Business Journal*
16.	Minneapolis/St. Paul	2.39	*Minn / St. Paul City Business*
17.	San Diego	2.37	*San Diego Business Journal*
18.	Baltimore	2.34	*Baltimore Business Journal*
19.	Pittsburgh/Beaver Valley	2.28	*Business Times (Pittsburgh)*
20.	Phoenix	2.03	*The Business Journal*
21.	Tampa/St. Petersburg/Clearwater	2.00	*Tampa Bay Business Journal*
22.	Denver/Boulder	1.86	*The Denver Business Journal*
23.	Cincinnati/Hamilton	1.73	*Cincinnati Business Courier*
24.	Kansas City	1.58	*Kansas City Business Journal*
25.	Milwaukee/Racine	1.57	*The Business Journal (Milwaukee)*
26.	Portland/Vancouver	1.41	*The Business Journal (Portland)*
27.	Sacramento	1.39	*The Business Journal (Sacramento)*
28.	Norfolk/Virginia Beach/Newport News	1.38	NA
29.	Columbus	1.34	*Business First* (Columbus)
30.	San Antonio	1.32	*San Antonio Business Journal*
31.	New Orleans	1.31	*New Orleans City Business*
32.	Indianapolis	1.24	*Indianapolis Business Journal*
33.	Buffalo/Niagara Falls	1.18	*Business First of Buffalo*
34.	Providence/Pawtucket/Fall River	1.13	*Providence Business News*
35.	Charlotte/Gastonia/Rock Hill	1.11	*The Business Journal (Charlotte)*
36.	Hartford/New Britain	1.06	NA
37.	Salt Lake City	1.09	NA
38.	Rochester	.98	*Rochester Business Journal*
39.	Memphis	.98	*Memphis Business Journal*
40.	Nashville	.97	*Nashville Business Journal*
41.	Orlando	.97	*Orlando Business Journal*
42.	Louisville	.97	*Business First*
43.	Oklahoma City	.96	*The Journal Record*
44.	Dayton/Springfield, OH	.95	*Dayton / Springfield Business Life*
45.	Greensboro/Winston Salem/High Point	.92	*Triad Business*
46.	Birmingham	.92	*Birmingham Business Journal*
47.	Jacksonville	.90	*Jacksonville Business Journal*
48.	Albany/Schenectady/Troy	.85	*Capital District Business Review*
49.	Richmond/Petersburg	.84	NA
50.	Honolulu	.84	NA
51.	West Palm Beach/Boca Raton/Elray Beach, FL	.82	NA
52.	Austin	.74	*Austin Business Journal*
53.	Scranton/Wilkes Barre	.74	NA
54.	Tulsa	.73	NA
55.	Raleigh/Durham	.68	NA
56.	Allentown/Bethlehem, PA-NJ	.68	NA
57.	Grand Rapids	.67	*Grand Rapids Business Journal*
58.	Syracuse	.65	*CNY Business Journal*
59.	Tucson	.64	NA
60.	Las Vegas	.63	*Las Vegas Business Press*

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[1]Estimated populations and MSA groupings are taken from *The World Almanac*, 1991 Edition.

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