Internet Appendix
Auditor Skill Demands and Audit Quality: Evidence from Job Postings
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May 2024

The table below explores the degree to which a series of observable characteristics explains the variation in the demand for auditors' cognitive and social skills. If the job posts are simply boilerplate, or are standardized by the human resources department, we expect there to be little within firm or office variation in the skill demands (i.e., accounting firm or office fixed effects should absorb the vast majority of the variation in the skill demands). We thus regress each skill type on a series of fixed effects and control variables to gauge the degree to which each explains variation in the skill demands. We initially include accounting firm, MSA, and year fixed effects, as well as controls for job seniority (e.g., associate, manager, etc.), education, and experience. We conduct this analysis (1) to better understand the determinants of the demand for cognitive and social skills in the audit industry, and (2) to gauge whether there is sufficient variation in the demand for cognitive and social skills to examine their relation with audit quality. We estimate the following model:

$$Skill = \beta_0 + \beta_1 Edu + \beta_2 Missing(Edu) + \beta_3 Exp + \beta_4 Missing(Exp) + \beta_5 Hierarchy + Accounting\ Firm\ FE + MSA\ FE + Year\ FE + \varepsilon, \quad (1)$$

where *Edu* is equal to the log of the number of years of education demanded in the job posting (e.g., 12 for a high school degree, 14 for an associate degree, 16 for a college degree, etc.) and *Exp* is equal to the log of the number of years of prior work experience demanded in the job posting. Both variables have relatively high numbers of missing values (in our sample, education requirements are missing in approximately 13% of the job postings and experience requirements are missing in approximately 37% of the job postings). To avoid sample attrition, we set both variables equal to zero when missing and include indicator variables that are set to one for these observations [*Missing(Edu)* and *Missing(Exp)*]. *Hierarchy* is the log of a count variable to capture the rank of the position within the audit team hierarchy. Specifically, it is set equal to 1 for associates, 2 for senior associates, 3 for managers, 4 for senior managers, 5 for directors, and 6 for partners (interns are dropped form the sample). The remainder of the variables are a set of fixed effects—accounting firm, MSA, and year. We conduct this analysis at the job posting level (i.e., each observation is a job posting). Table 2 Panel B reports the results.

As may have been expected, accounting firm fixed effects explain the most variation in the skill demands—roughly 10% (19%) of the variation in cognitive (social) skill demands. The variables capturing location, year, education, experience, and seniority together explain approximately 4% (5%) of the variation in cognitive (social) skill demands. But, there is also considerable unexplained variation (86% for cognitive skills and 76% for social skills), suggesting the job posts contain more than just across firm variation (i.e., there is a firm effect, but the firm does not completely standardize the job posts). Next, we estimate the same models, but replace the accounting firm and MSA fixed effects with audit office fixed effects (i.e., accounting firm by MSA fixed effects). The results are reported in Table 2 Panel C. The audit office fixed effects explain much more of the variation in skill requirements—15% (25%) for cognitive (social) skills—suggesting there is within accounting firm variation in the skill demands, but considerable unexplained variation remains.

This analysis suggests (i) there is considerable variation in the demand for cognitive and social skills in auditors that is not picked up by the accounting firm or office fixed effects, and (ii) the audit office fixed effects pick up more variation in the skill demands relative to accounting firm fixed effects, suggesting that audit offices are not completely homogenous in their demand for auditor skills, even within the same firm.

The two panels below report the explanatory power of different factors affecting the variation in auditor job posting skill demands. The unit of analysis is a job posting. The sample includes 55,967 auditor job postings over the period 2010-2019. In Panel A, we regress each skill measure on accounting firm fixed

effects, MSA fixed effects, year fixed effects, years of education, years of experience, indicators for whether education and experience requirements are missing, and the position's hierarchy. In Panel B, we include the same set of predictors, but replace the audit firm and MSA fixed effects with audit office fixed effects (Audit Firm-by-MSA).

Panel A: Firm Fixed Effects

Skill Type	*Firm Fixed Effect*	*MSA Fixed Effect*	*Year Fixed Effect*	*Edu/Exp*	*Hierarchy*	*Residual*
Cog	10.13%	1.30%	1.89%	0.94%	0.01%	85.74%
Soc	19.24%	0.83%	2.83%	0.57%	0.49%	76.04%

Panel B: Office Fixed Effects

Skill Type	*Office Fixed Effect*	*Year Fixed Effect*	*Edu/Exp*	*Hierarchy*	*Residual*
Cog	*15.15%*	*0.13%*	*0.79%*	*0.00%*	*83.92%*
Soc	*24.70%*	*0.00%*	*0.56%*	*0.50%*	*74.24%*

The figure below presents a word cloud of the 200 most prevalent skills in the 55,967 auditor job postings in our sample. The size of each skill keyword in the word cloud reflects the frequency of that skill among the population of job postings. The word cloud is created using https://wordart.com.

The table below lists each of the skills in the auditor job posts in our sample that are categorized as either cognitive skills (Panel A) or social skills (Panel B). We report each skill along with its frequency (the number of job posts the skill appears in, out of the 55,967 auditor job posts in our sample).

Panel A: Cognitive Skills

N	Skill Name	Frequency
1	research	16719
2	problem solving	6468
3	thought leadership	4595
4	performance analysis	4197
5	multi-tasking	3645
6	creativity	3448
7	analytical skills	2094
8	decision making	1546
9	critical thinking	1528
10	data analysis	1448
11	creative problem solving	692
12	model building	498
13	independent thinking	477
14	troubleshooting	429
15	business intelligence	428
16	calculation	388
17	business analysis	274
18	online research	264
19	strategic thinking	177
20	competitive analysis	154
21	statistical reporting	144
22	operations analysis	122
23	variance analysis	110
24	knowledge management	93
25	statistics	90
26	statistical analysis	88
27	econometrics	85
28	risk and mitigation analysis	69
29	qualitative analysis	68
30	technical analysis	55
31	business case analysis	48
32	organizational analysis	48
33	market research	40
34	performance analytics	32

35	regression analysis	31
36	quantitative analysis	29
37	industry analysis	27
38	pricing analysis	27
39	requirements analysis	24
40	total cost of ownership (tco) analysis	24
41	strategic recommendations	24
42	stakeholder analysis	21
43	predictive models	19
44	design thinking	19
45	data trending	18
46	root cause analysis	18
47	economic analysis	16
48	report analysis	16
49	market analysis	14
50	cluster analysis	13
51	applied statistics	12
52	basic research	11
53	predictive analytics	11
54	multivariate regression	11
55	qualitative research	9
56	strategic analysis	9
57	forecasting	8
58	random forests	8
59	problem identification	8
60	regression testing	7
61	conceptual data models	7
62	business impact analysis	7
63	consumer research	7
64	analytical testing	6
65	monte carlo simulation	6
66	fit/gap analysis	5
67	variance explanation	5
68	problem analysis	5
69	ad hoc analysis	5
70	responding to technical questions	4
71	sensitivity analysis	4
72	analysis computing tools	4
73	quantitative data analysis	4

74	economic models	4
75	algebra	3
76	bootstrapping	3
77	statistical methods	3
78	geometry	3
79	secondary market analysis	2
80	research reports	2
81	analytic functions	2
82	time series analysis	2
83	efficiency analyses and testing	2
84	financial data interpretation	2
85	calculus	2
86	computational modeling	1
87	time series models	1
88	regression algorithms	1
89	quantitative research	1
90	life cycle cost analysis	1
91	basic mathematics	1
92	social network analysis	1
93	deep learning	1
94	naive bayes	1
95	mathematical modeling	1
96	support vector machines (svm)	1
97	neural networks	1
98	numerical analysis	1

Panel B: Social Skills

N	Skill Name	Frequency
1	communication skills	23489
2	staff management	14245
3	teamwork / collaboration	11505
4	building effective relationships	11134
5	verbal / oral communication	7226
6	leadership	6994
7	written communication	5914
8	writing	5395
9	mentoring	4645
10	people development	4092
11	presentation skills	3901

12	supervisory skills	2987
13	proposal writing	1505
14	staff development	785
15	oral communication	718
16	people management	696
17	persuasion	611
18	team building	551
19	team management	545
20	negotiation skills	533
21	report writing	502
22	talent management	493
23	business communications	460
24	preparing proposals	407
25	conflict management	400
26	public speaking	349
27	listening	349
28	technical writing / editing	306
29	employee relations	225
30	business writing	197
31	strategic communications	152
32	prepare presentations	103
33	effective communications	92
34	personnel management	88
35	articulating value propositions	85
36	employee engagement	80
37	strategic leadership	80
38	corporate communications	61
39	persuasive writing	51
40	internal communications	36
41	stakeholder communications	15
42	crisis communications	8
43	presenting solutions	6
44	presentation delivery	4
45	business presentations	2
46	client relationship building and management	2