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Do Economics Departments Search Optimally in Faculty Recruiting?

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by

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Abstract

Casual observation of faculty searches by economics departments suggests that search scope varies widely. Some departments search primarily in a narrow subfield, while others search in several general or even all fields. This raises two questions: First, what is the optimal search scope for a recruiting department? And second, do departments search optimally? This paper develops a simple search model in which optimal search scope is shown to increase in the quality rank of the department. Using data from *Job Openings for Economists*, we find that higher-ranked departments do indeed conduct broader searches. This relationship is robust to the exclusion of the highest-ranked departments from the sample. We correct for measurement error in department rankings by instrumenting a reputation-based ranking with a publication-based ranking, which increases the magnitude of the quality-rank coefficient. We find that a 10-place difference in department ranking is associated with 3.3-4.6 more JEL subfields listed in a position announcement.

JEL codes: J44, J64, D83, L8
Keywords: Employer Search, Search Scope, Faculty Recruiting, Economics Department Rankings

2. The Model

We consider a simple model that focuses on a department's decision in choosing the number of fields to search and show that the optimal number of fields searched is increasing in department quality. Other work on employer search has noted the benefits to some employers of broadening the applicant pool. Much like our finding that departments with higher quality standards will important in explaining why a higher-ranked department is better off expanding its search to more fields.

To formalize the model, there are $i=1,...,M$ fields in which a department can conduct its search. Each field searched by the department produces one applicant, whose quality, q_i, is a random draw from a Uniform Distribution on support [0,1]. For each department there is an exogenous quality cut-off, k, where $k \in (0,1)$ and is increasing in the reputation or ranking of the department. The department will not accept any candidate for whom $q<k$. Each department knows, without cost, if $q_i<k$ and disposes of these applications, but does not know the actual value of q_i. The department reviews each application with $q_i \geq k$ at cost c to determine the true quality level. Intuitively, one can think of the department doing an initial "quick sort" of applications into two piles, one of which will be discarded and the other reviewed in more detail in order to determine how the applicants in that pile rank relative to each other. We assume that the department has perfect and costless information on the binary outcome of whether the applicant is above or below the quality cut-off, so that every application discarded is in fact below the cut-off and every application reviewed meets the cut-off.

$$Q_{\max} = \max\{Q_i : i = 1, \ldots, m\}, \tag{1}$$

where the probability distribution of each Q_i is:

$$(\ ) \ ) \qquad \leq \ . \tag{2}$$

k

e

the function is steeper for higher-ranked departments, reflecting the fact that candidates are more likely to accept their offer, the high-ranked department receives the larger benefit at high values of q.[3]

The department's payoff from searching m fields is therefore

$$y(m, q_c) = k \frac{q_c - k}{1 \quad k} - cn$$

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standards. It is therefore likely that a narrow search may fail to produce an applicant of sufficient quality. Second, because a higher-ranked department will dispose of more applications without cost, the cost of expanding the search to more fields is lower than that experienced by lower-ranked departments. Third, while the surplus for hiring a candidate of any particular quality is higher for lower-ranked departments, the probability an applicant will accept an offer from the department is higher for higher-ranked departments. This prevents the search benefit to lower-ranked departments from universally dominating the search benefit to higher-ranked departments.

Because our simple model omits many features of what is actually a very complex process, it is easy to offer alternative explanations that would also generate a relationship between department quality and search scope. F confirm empirically that employers search more extensively (over more candidates) when the education requirements for the job are higher. There has been no formal analysis of search behavior of economists. Carson and Navarro (1988) do report the results of a survey of economics departments concerning their recruiting practices. Their results provide some preliminary support for our hypothesis in that they find that only 24% of top 20 departments report that a candidate's fields of specialization are of great importance in the decision to schedule an interview compared to 61% of 380 other departments. In fact, 35% of top 20 departments reported that field was of slight or no importance compared to only 6% of the other economics departments.

business school positions (such as finance) are excluded. Positions announced by economics departments that are located in business schools are, however, included in the data.

The purpose of these sample selection criteria are to exclude announcements that by their very nature are more likely to involve a narrower search. We exclude lower-ranked departments, because the fact that they tend to be teaching-oriented changes the interpretation of the field listings. For example, a research-oriented department might list several fields in their announcement indicating that they are willing to look at applicants with research interests in any of those fields. In contrast, a teaching-oriented department might list several fields to indicate that they need someone who can teach courses in all of those fields.

We obtain rankings of economics departments from four different sources. The 1993 National Research Council (NRC) ranking206 3i12.0206 270.2743 433.1954 Tm(206 3i10o63 Tm(e)Tj12.0206 0

would be useful to use this alternative ranking as a robustness check. Unfortunately, with only 50 departments included in the ranking, its use substantially limits our sample size.

For our initial analysis, we consider whether or not a department conducts a broad "Any Field" (AF) search. In tel average ranking of departments who do not qualify their AF search ranges from 13.6 to 25.9. The difference in the means between these two groups is significant at the .01 level in three of the four years. Therefore, this analysis indicates that higher-ranked departments are more likely to conduct broad AF searches, and in particular, higher-ranked departments are more likely to list AF as their search code without further clarification.

For our regression analysis, the unit of observation is a position announcement. Many departments post multiple announcements because they are recruiting for more than one position. Our regression analysis is appropriately weighted to account for the fact that departments advertising more positions have more observations in the data. If a position announcement advertises multiple positions and it is clear which of the listed fields are intended for which positions, the position announcement is separated out into multiple observations. Because some announcements cannot be decomposed this way, we control for the number of positions advertised in the announcement in some of our analysis below.

In order to more fully use the information in the announcement, we construct a measure of search scope based on all of the fields listed in the posting. In the JEL classification system, there are 19 general headings (such as D0-Microeconomics), each of which contains one to nine subheadings (such as D4-Market Structure and Pricing fields. C1 counts as one subheading, J0 contains seven subheadings and F0 contains four subheadings. Therefore, this announcement would cover 12 subheadings, for a search scope value of .12. Any position announcement listing AF receives a search scope value of 1.0.

There are some obvious limitations to our search scope measure. The University of Hawaii example above was chosen specifically to illustrate this limitation. First of all, the announcement lists C1-Econometrics, which only adds .01 to the search size even though econometrics is a large field. Some announcements list C0-Econometrics as opposed to C1, which would generate a larger search scope value. In addition, while the ad lists C1, J0 and F0 as *JEL* codes, the text of the ad indicates that the department wants an econometrician who has labor or international as a secondary field. In this case, the scope of the search is somewhat narrower than the *JEL* listings imply. Despite this limitation, we are reluctant to introduce a substantial subjective component into our analysis by trying to incorporate the additional information provided in the text of the ads.

It is also the case that the final outcome of a search might be very different from what was indicated in the department's ad. We do not have data on the final outcome of the search, so we assume that the ad placed by the department is an indicator of that department's true intent. We only need to assume that departments that intend broader searchers typically place ads that generate larger search scope values.

In Figure 2, we plot our search scope variable against the department's NRC ranking for the 531 observations in our data set. Figure 2 shows that most department searches are fairly narrow. The median search, among non-AF searches, has a search scope value of .09 (the size of a larger general field). The 25th percentile is .04 (the size of a small general field), and the 75th percentile is .18. There is a clear negative correlation between search scope and NRC rank. As was suggested by Table 1, the AF searches are clustered at the higher ranks. What Figure 2 reveals, however, is that even ignoring the AF searches, there still appears to be a negative relationship between search scope and department rank.

In the first column of Table 2, we report the pair-wise correlation coefficients between field size and the four different department rankings. In the second column, we report the correlation coefficients obtained when the AF searches are excluded from the data. For the full sample results in the first column, the correlations range between -.31 and -.40, all of which are statistically significant at the .01 level. For addition, announcements from departments in business schools and announcements for joint positions tend to be narrower in scope. Finally, larger departments tend to have broader searches.

One variable that is not included in the analysis in the first column is the number of positions advertised in the job announcement. An announcement that is intended to fill multiple positions will most likely list more fields than one that is intended to fill a single position. The number of positions is therefore an important control variable. Recall, however, that if a department is hiring for multiple positions, but separately lists the fields associated with each position, either in separate announcements or in the text of a single announcement, each position appears in the data as a separate observation. It is only if a department advertises multiple positions in a single job announcement without assigning specific fields to each position that the fields for multiple positions will be included in a single obse

The results in Table 3 could largely reflect the behavior of the top few departments. It is well known that a number of the top departments, such as Harvard, Yale and University of Chicago, tend to conduct "best-athlete" searches every year by advertising AF searches. We therefore repeat the analysis from Table 3 in Table 4, but using only those departments that do not appear in the top 10 of any of our four rankings. This eliminates 16 depa ranking is, like the NRC ranking, a reputation-based ranking. Therefore, the measurement errors are likely to be correlated. The Dusansky and Vernon only includes fifty departments, substantially reducing our sample size. The Scott and Mitias ranking is publication-based, ranking departments by total pages in 36 journals from 1984-93 per faculty member, and available for all departments in the NRC ranking. The measurement error in the NRC ranking is most likely going to reflect the lag with which reputations adjust for departments that have improved or declined. In contrast, the measurement error in the Scott and Mitias ranking is more likely going to reflect 43.5983 Tm(to r)Tj12.020>n2.

variables. While we do not claim that these estimates are consistent, we do claim that they are subject to less measurement error bias than those reported in Tables 3 and 4. The first column of Table 5 repeats the coefficient on NRC ranking from the Tobit regressions estimated in Tables 3 and 4. The second column reports the IV estimate. Instrumenting with the Scott and Mitias ranking increases the magnitude of the coeffici economics departments. The recruiters receive resumes from interested candidates and quickly selects (with little cost) those that exceed the firm's minimum quality threshold for (more costly) interviewing. The more prestigious law firm will recruit at more campuses across a broader geographic area in order to insure that they find enough prospective employees that exceed their higher quality threshold.

References

Amemiya, Yasuo. 1985. "Instrumental Variable Estimator for the Nonlinear Errors-in-Variables Model." *Journal of Econometrics* 28: 273-89.

Barron, John, John Bishop and William Dunkelberg. 1985. "Employer Search: The Interviewing and Hiring of New Employees." *Review of Economics and Statistics* 67:43-52.

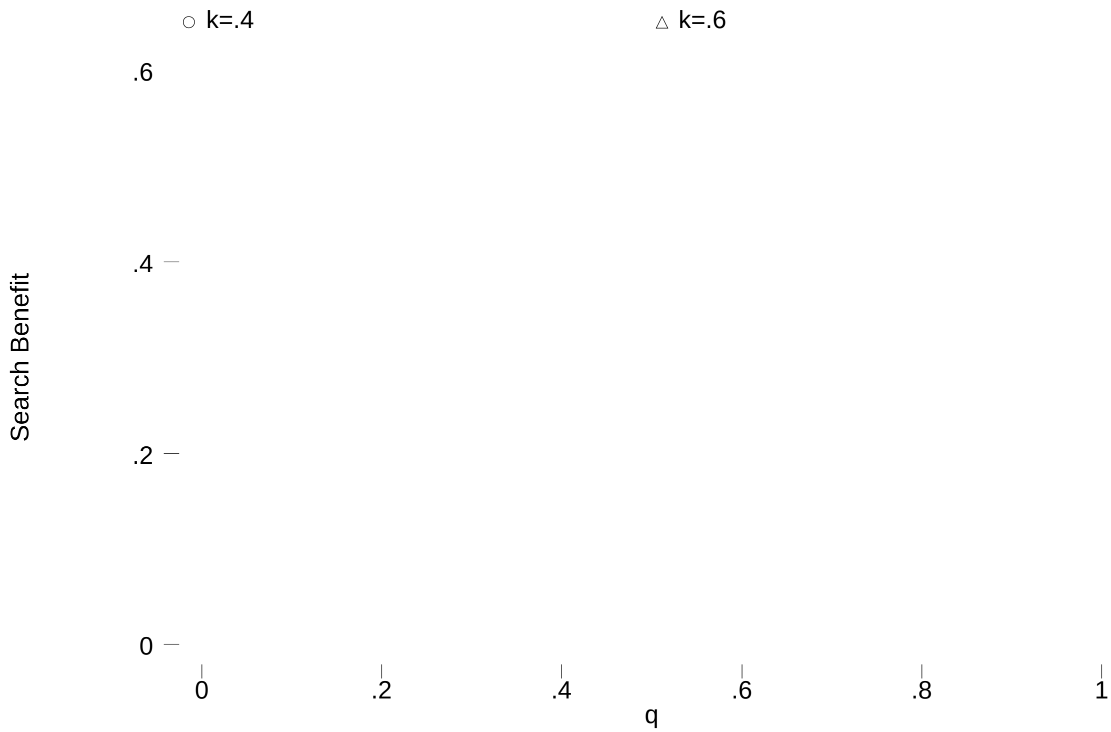
Barron, John, Mark Berger and Dan Black. 1997. "Employer Search, Training and Vacancy Duration." *Economic Inquiry* 35:167-92.

Carroll, R.J., D. Ruppert and L.A. Stefanski. 1995. *Measurement Error in Nonlinear Model*s. London: Chapman&Hall.

Carson, Richard and Peter Navarro. 1988. "A Seller's (& Buyer's) Guide to the Job Market for Beginning Academic Economists." *Journal of Economic Perspectives* 2(2):137-48.

Dusansky, Richard and Clayton Vernon. 1998. "Rankings of U.S. Economics Departments." *Journal of Economic Perspectives* 12(1):157-70.

Hausman, JL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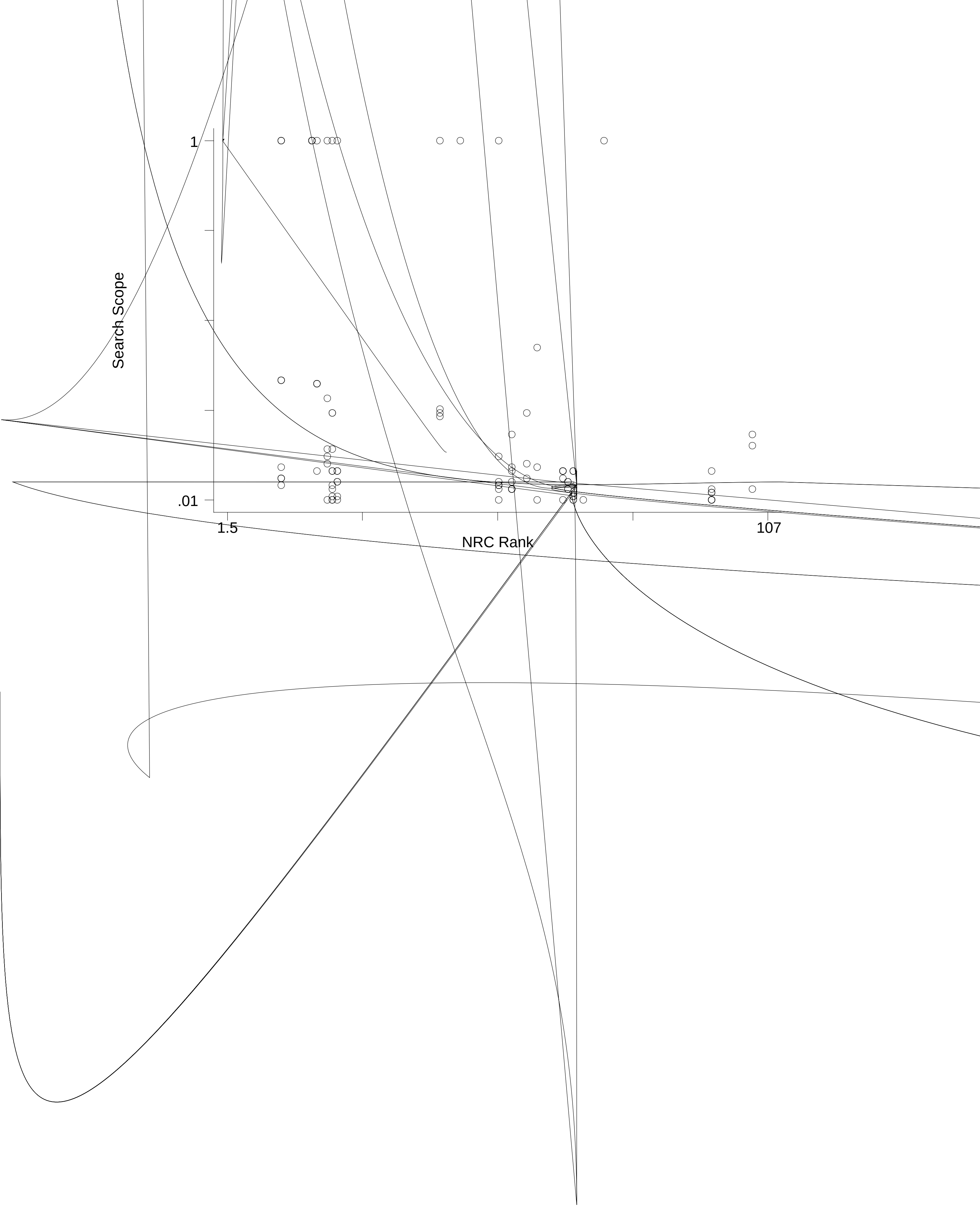

Search Scope
1
.01
1.5
107
NRC Rank

Table 1: Average NRC Ranking by Type of Search

Year	No AF Search	AF Search	T-Test	AF Qualified	AF

Table 2: Correlations Between Search Scope and NRC Ranking

Ranking	Full Sample	Search Scope <1
NRC	-0.398**	-0.294**
	[531]	[399]
US News	-0.330**	-0.254**
	[375]	[358]
Scott and Mitias	-0.387**	-0.295**
	[526]	[394]
Dusansky and Vernon	-0.314**	-0.089
	[293]	[197]

Notes: Table reports the correlation between department ranking and search scope variable for each of the four rankings. Sample size reported in brackets. **p-value<.01 *p-value<.05

Table 3: Tobit Analysis of Determinates of Search Scope

	Without Positions Control	With Positions Control
NRC Ranking	-0.0034** (0.0007)	-0.0027** (0.0007)
Business School	-0.2188** (0.0550)	-0.1709** (0.0539)
Private University	0.0397 (0.0313)	 (0.0013)

-0. 67( )TjETEMC/P <</MCID857 >BDCBT/TT2 1 Tf-0.0015 Tc 12.0

o	-0.5027** (0.4807)	-0.0707** (0.4857)
	-0.6726	-0.0526

Table 4: Tobit Analysis of Determinates of Search Scope Among Non-Top10 Departments

Without 12.0206	0	(

Table 5: Coefficient on NRC Ranking in Baseline and IV Versions of Tobit

	Tobit	Tobit-IV
Full Sample	-0.0034** (0.0007)	-0.0046** (0.0009)
Full Sample		

Appendix A

Proof of Lemma 1. For $m \in (0, M-1]$,

$$
\begin{aligned}
\frac{\partial \Delta y(m)}{\partial k} &= \frac{1}{(1-k)^2}\int_k^1 x^m (1-x)dx - \frac{k}{1-k}k^m(1-k) \quad c \\
&= \frac{1}{(1-k)^2}\int_k^1 x^m (1-x)dx - k^{m+1} + c \\
&> \frac{1}{(1-k)^2}k^m \int_k^1 (1-x)dx - k^{m+1} + c \\
&= \frac{k^m}{(1-k)^2}\frac{(1-k)^2}{2} - k^{m+1} + c \\
&= k^m(\tfrac{1}{2} - k) + c
\end{aligned}
$$