Intra-Institutional Factors That Influence Accounting Research Productivity

Steve Buchheit, (E-mail: buchheit@ba.ttu.edu), Texas Tech University
Allison B. Collins, (E-mail: acollins@uh.edu), University of Houston
Denton L. Collins, (E-mail: dlcollins@uh.edu), University of Houston

Abstract

This paper examines actionable factors that influence research output of accounting faculty. Using a regression model, we investigate how internally controllable factors influence both the quantity and quality of research productivity. We document and quantify how reduced teaching loads, greater research support, longer probationary periods, and proper allocations of time by faculty consistently lead to significantly increased research output. Depending on the research output metric examined, we also find that fewer teaching preparations, more outside consulting and mentor relationships result in higher output. Our results update and complement the past survey and empirical findings of Cargile and Bublitz (1986), Chow and Harrison (1998) and Fogarty and Ruhl (1997).

Introduction

This paper investigates intra-institutional factors that contribute to the accounting research productivity of new faculty. We distinguish our study from prior literature (which we characterize as primarily "inter-institutional" studies) by holding factors exogenous to a particular academic institution constant. Research productivity is increasingly important to obtaining promotion and tenure (Read et al. 1998, Schultz et al. 1989, Hagerman and Hagerman 1989, Milne and Vent 1987) and a number of papers assess various dimensions of research productivity (see Reinstein and Hasselback 1997 for a review). However, the breadth and depth of extant literature is surprisingly limited with respect to research-enhancing factors that individuals and administrators can influence given their current institutional "state of the world." To our knowledge, only Cargile and Bublitz (1986) and Chow and Harrison (1998) identify intra-institutional factors that encourage and promote research and publication activities by academic accountants. However, both of these studies simply report on those factors that faculty felt were important to their publication success and neither attempts to measure or estimate the associations between these factors and actual research output levels. As such, neither paper offers guidance on the possible trade-offs between research facilitators and productivity. In this paper, we attempt to complement and update knowledge about intra-institutional factors that are associated with research productivity.

Readers with comments or questions are encouraged to contact the authors via email.

Identifying intra-institutional factors that contribute toward research productivity is important because such factors offer actionable, research-enhancing guidance to individuals and institutions with limited option sets. Although prior research investigates inter-institutional factors such as (1) where authors earn their doctoral degrees (Bublitz and Kee 1984, Jacobs et al. 1986, Fogarty and Ruhl 1997), (2) where authors work (Milne and Vent 1987, Campbell and Morgan 1987, Fogarty and Ruhl 1997), and (3) authors' innate abilities (Maranto and Streuly 1994), these factors may not be actionable by individuals and/or institutions wishing to enhance research productivity. For example, knowing that graduates from University X are, on average, more productive researchers than graduates from University Y will not help a potential doctoral student who is not admitted to University X's doctoral program. In addition, knowledge about relative productivity between institutions will not help a faculty unable to hire a graduate from University X. In essence, our study addresses the question, "Given that my institution is University Y, what can be done to increase research productivity?"

Using survey data, we develop and estimate a cross-sectional model of accounting faculty research output. Given the multitude of issues that arise when investigating "research productivity" (Reinstein and Hasselback 1997), we estimate our model using four separate measures of research productivity. We find four robust, intra-institutional factors that systematically influence research output. Specifically, (1) proper allocations of research time, (2) longer probationary periods, (3) reduced teaching loads, and (4) financial research support are all associated with significantly increased research productivity. In addition, we find that intra-institutional mentor relationships, the number of teaching preparations, and the amount of outside consulting are significantly associated with research output; however, the direction and significance of these associations are conditional upon the choice of dependent variable metric.

While our results have implications for individuals and/or institutions with "full option sets," we believe our study should be of particular interest to doctoral students, faculty, and administrators who would like to increase research productivity, but face the constraint of working within their current "state of the world." As added guidance, our model specifically estimates the tradeoffs necessary to increase research productivity.

Background

The magnitude of research assessing ratings/rankings of accounting programs, accounting doctoral programs, and accounting journals is not surprising given that many constituencies need "objective" means of comparison. Reinstein and Hasselback (1997) summarize this research and describe each constituencies' need for rating/ranking information. For example, departmental promotion and tenure committees, administrators and other decision makers need "objective" information to make informed merit pay allocations and promotion and tenure decisions. Similarly, doctoral students and faculty considering job offers use the results of rating/ranking studies to assess the expectations and effectiveness of potential employers. Conversely, potential employers use rating/ranking results to help them make informed hiring decisions. Surprisingly, the vast majority of research does not speak to the issue of how to increase research productivity within a given institution.

To our knowledge, only Cargile and Bublitz (1986) and Chow and Harrison (1998) investigate what we label "intra-institutional" factors that are conducive to academic accountants' research productivity. Specifically, Cargile and Bublitz analyze results from 208 questionnaires that asked academic accountants to comment on the relative importance of a number of factors that influence their research productivity. The authors' results offer actionable advice for those who wish to increase research productivity given

their current institutional environment. For example, the authors document that researchers perceive "reduced teaching loads" increase research productivity while "access to statistical consulting" does not. However, the authors do not attempt to measure or quantify the effects of these factors on research output levels. In a similar study, Chow and Harrison survey 61 'influential' accounting authors to identify productivity facilitators. From the responses, they identified a number of factors that respondents perceived to be important to publishing success. These include respondents' skill and knowledge (most important), the research topic chosen and methodology used, the availability of research support (including supportive colleagues and time to execute research), personal attributes (persistence and hard work), and the mechanics and politics of being published (presenting at workshops and conferences). However, similar to Cargile and Bublitz, Chow and Harrison do not report on the statistical associations between these factors and actual research output or number of citations.

Our study extends the work of Cargile and Bublitz and Chow and Harrison in three significant ways. First, our study provides point estimates that are helpful when assessing cost-benefit relationships (e.g. if "reduced teaching loads" are granted, by how much should research productivity improve?). Specifically, because we model the quantity of publications as a function of intra-institutional factors and other control factors, we are able to report on the incremental benefits associated with a particular factor while holding other factors constant. Because of the design of their studies, neither Cargile and Bublitz nor Chow and Harrison are able to address these trade-offs that are available to both faculty and administrators. Second, our study investigates a different, and arguably more relevant, set of research-facilitating factors when compared to the Cargile and Bublitz study, and a richer set of factors when compared to the study of Fogarty and Ruhl (1997).[1] Finally, our work provides early, and possibly more relevant, career guidance to faculty who are perhaps not trained at top-tier institutions or who may not have the resources that were available to those 'influential' faculty surveyed by Chow and Harrison.

Method

In order to concentrate on faculty most likely to be actively engaged in research, we focused our survey on assistant and associate professors and their research output at their first employing institution. Using Hasselback's *Accounting Faculty Directory*, we surveyed all U.S. university faculty members in the 1991-1992 academic year who received their doctoral degrees in the years 1978 to 1986.[2] A total of 549 surveys were mailed in May 1992 and a second mailing occurred in August of 1992. We received 322 responses (a 58% response rate), but due to missing data, we were able to analyze only 234 responses.[3] The items in our survey were selected by the authors, in consultation with colleagues and a review of the existing literature, as being potentially important intra-institutional factors that influence research productivity. While all of the factors selected are endogenous to a particular institution, we create a dichotomy between (1) intra-institutional factors actionable by an individual and (2) intra-institutional factors actionable by a faculty. For each respondent, we focused on the research output generated at the first employing institution as well as the factors that characterized that institution.[4] Specifically, we asked respondents about the following factors:

Factors Actionable by an Individual:

1. actual versus institutional-expected time devoted to job-related activities (research, teaching, service, and other),
2. whether or not the respondent left school ABD,
3. the number of years the respondent was in a PhD program,
4. the amount of consulting work performed by the respondent.

Factors Actionable by a Faculty:

1. the average total number of courses taught per year,
2. the average total number of course preparations taught per year,
3. the average total number of new course preparations taught per year,
4. whether or not teaching assistance was provided,
5. whether or not grading assistance was provided,
6. whether or not the respondent received financial research support,
7. whether or not the respondent established a mentor relationship at his or her employing institution.

Note that each factor in the preceding list represents an intra-institutional factor that is actionable by either an individual or by that individual's institution.

We also asked respondents to quantify their research output. We asked for total publications in refereed journals and we asked for specific journal titles in order to assess "quality" publications using three separate measures of "quality."[5] Our first "quality" definition is based on the rankings of Hull and Wright (1990) and Henderson et al. (1990) who list the top 22 journals based on overall rankings. Our second and third "quality" measures are based on Brown and Huefner's (1994) journal rankings. Although Brown and Huefner rank 44 journals, we follow Read et al.'s (1998) approach of analyzing (1) the top nine journals that ranked above the midpoint on Brown and Huefner's (1994) scale, and (2) the three top ranked journals.[6] In total, we believe these three separate dependent measures of research productivity offer a reasonable proxy for "quality" research output.[7]

Finally, we asked about non-intra-institutional factors that have been found to affect or are expected to affect research productivity. We gathered information about each respondent's doctoral granting institution and employing institution (Schroeder and Saftner 1989; Pirozzoli et al. 1993; Carolfi et al. 1996). We also asked for each respondent's (1) gender (Collins et al. 1998, Dwyer 1994), (2) accounting-related work and prior teaching experience, and (3) eventual tenure decisions.[8]

Model of Research Productivity

Dependent Variables

We separately model the number of refereed publications as (1) the total number of publications and (2) the number of publications in each of the three preceding "quality" definitions. Because the analyzed publication data consist of frequency counts with a relatively high frequency of zeroes, we employ a Poisson regression model in order to facilitate more efficient estimates (Greene 1993).

Explanatory Variables

Our initial model includes twelve intra-institutional variables and seven control variables. This exploratory model is large; however, we discuss the rational for each variable in this section and discuss reducing the model based on statistical analysis in the next section.

We first consider factors that are actionable by individual faculty members. A primary choice made by faculty members is how they allocate their time (*TIMEALLOC*). Because research expectations vary by institution, we measure time allocated to research activities by subtracting the proportion of time actually spent on research activities from that faculty member's perception of how his or her department expects time to be allocated. A positive value implies that a faculty member spent less time than expected on research. Consequently, we expect a negative sign on the *TIMEALLOC* variable. We next consider choices made by individuals prior to taking their first academic job. Specifically, we consider whether the respondent left his or

Table 1
Means of Explanatory Variables

Variable Groups	Doctoral Schools[1]	Nondoctoral Schools[1]	Overall
Individually Actionable Variables:			
TIMEALLOC	10.930*	4.460	8.250
ABD	0.606*	0.763	0.671
PROGYRS	4.519*	5.165	4.787
CONSULT	3.422	4.118	3.710
Faculty Actionable Variables:			
TLOAD	4.178*	5.487	4.721
PREP	2.363*	3.206	2.713
NPREP	0.932	1.129	1.013
GRADER	0.635*	0.454	0.560
TA	0.285*	0.083	0.201
RSUPP	0.876*	0.454	0.701
MENT	0.190*	0.083	0.145
YRSTRK	4.971	4.397	4.733
Control Variables:			
GEN	0.861	0.794	0.833
TGRAN	0.460	0.505	0.479
PHDQUAL	0.248*	0.093	0.184
MENTDOC	0.350	0.330	0.342
ACCTEACH	0.526*	0.660	0.581
ACCWORK	0.599	0.660	0.624

[1] - A total of 137 respondents in our sample were initially employed at doctoral-granting schools (*ACCDOC* = 1); the remaining 97 were initially employed at nondoctoral schools (*ACCDOC* = 0).

* - The asterisk indicates that a significant difference ($p \# 0.05$) exists between doctoral schools and nondoctoral schools on this dimension. Statistical significance is determined using the nonparametric Wilcoxon test.

her doctoral institution with degree in hand (*ABD* = 0) or not (*ABD* = 1). Leaving without degree in hand may limit a faculty member's ability to generate additional research immediately upon joining his or her first employer, which implies a negative sign on the ABD variable. We measure the length of time (in years) that the faculty member spent in her or his doctoral program (*PROGYRS*). Because longer program times can imply either a head start on a research career (a positive effect) or a relatively slow researcher (a negative effect), we make no prediction for the sign of this coefficient. Finally, we consider whether the faculty member engaged in consulting work at the employing institution. The variable *CONSULT* (modeled as the square root of the reported annual number of consulting hours) is expected to carry a negative sign if it leads to a reduction in the time available for research, or a positive sign if it leads to additional research opportunities.[9] As such, we make no prediction for the sign of this coefficient.

We next consider factors that are actionable by a specific faculty that may influence research productivity. The respondent's teaching load (*TLOAD*; adjusted to a semester system), the number of course preparations (*PREP*), and the average number of new course preparations each year (*NPREP*) are all expected to be inversely related to research productivity.[10] Prior research (e.g., Chow and Harrison 1998) suggests re-

duced teaching loads or total course preparations for its faculty members should leave additional time to devote to research and should lead to increased output. Alternatively, faculty members could be given additional resources such as grading assistance (*GRADER* = 1 if grading assistance was supplied, 0 otherwise) or teaching assistance (*TA* = 1 if teaching assistance was supplied, 0 otherwise). If such other resources are available, research productivity is expected to increase. Likewise, the availability of financial research support (*RSUPP* = 1 if support is available, 0 otherwise) should lead to improved output if individuals are then able to devote their summers to research rather than teaching or if they are able to obtain research resources with the funding that would otherwise be unavailable (Maranto and Streuly 1994). If financial resources do not permit direct research support or personal assistants, mentoring is a possible alternative (Long et al. 1993). We expect a positive sign on the *MENT* variable (coded 1 if a mentoring relationship was established, 0 otherwise). We also measure the length of time (in years) that the faculty member was on tenure track (*YRSTRK*). Longer tenure tracks are likely to translate into higher output given the lengthy review process, thus suggesting a positive coefficient.

Finally, we consider seven control variables that are not directly actionable by an individual or a faculty. Even though they are not actionable, we control for these factors in order to better estimate and interpret the marginal effects of the preceding intra-institutional factors and because these factors have been found to influence research productivity. Based on the findings of Dwyer (1994) and Rama et al. (1997), we incorporate the individual faculty member's gender (*GEN* = 1 if the respondent was male, 0 otherwise). We consider a respondent's tenure status (*TGRAN* = 1 if the respondent achieved tenure at the first employing position, 0 otherwise), and type of first employing position (*ACCDOC* = 1 if the first employing position offered a doctoral program in accounting, 0 otherwise). *TGRAN* is included in the model because, everything else being equal, faculty granted tenure at their first position are likely to have generated more research output than faculty denied tenure (Schultz et al. 1989). *ACCDOC* is included because prior research documents significantly different research expectations and output (both in terms of quantity and quality) between doctoral-granting and nondoctoral-granting institutions (Fogarty and Ruhl 1997, Read et al. 1998). We also include a binary variable, *PHDQUAL*, that indicates whether the respondent received her or his degree from a "prestige" doctoral program (coded 1 if yes, 0 otherwise) based on the Schroeder and Saftner (1989) rankings.[11] Higher quality training should be associated with both increased overall output and increased quality output (Fogarty and Ruhl 1997, Maranto and Streuly 1994). We measure whether the respondent was able to establish any mentor relationships in his or her doctoral program (*MENTDOC* =1 if yes, 0 otherwise). We expect that a mentor relationship during the doctoral program might lead to research collaboration between mentor and doctoral student (Long et al. 1993), thus providing a relative research advantage. We also control for accounting teaching experience prior to doctoral study (*ACCTEACH* = 1 if the respondent had prior teaching experience, 0 otherwise). It is possible that respondents with prior teaching experience may have entered their respective PhD programs with a relative predisposition toward teaching and away from research. Alternatively, prior teaching experience might reduce the necessary preparation time at the employing institution, leaving more time for research. Because of these competing explanations, we make no directional predictions for the *ACCTEACH* coefficient. Finally, we control for prior professional accounting work experience (*ACCWORK* = 1 if yes, 0 otherwise) because prior work experience should provide institutional knowledge that leads to research output. As such, we anticipate a positive sign on the *ACCWORK* coefficient.

Table 2
Research Output By Type of Initial Position
(Doctoral versus Nondoctoral)

*Dependent Variable A - Total Research Output:***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Aggregated over all schools	234	4.77	0.00	3.00	6.25
Doctoral schools	137	6.19	2.00	5.00	8.00
Nondoctoral schools	97	2.76	0.00	1.00	4.00

*Dependent Variable B - Top 22 Journals (Hull and Wright Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Aggregated over all schools	234	1.04	0.00	0.00	2.00
Doctoral schools	137	1.51	0.00	1.00	3.00
Nondoctoral schools	97	0.37	0.00	0.00	0.00

*Dependent Variable C - Top 9 Journals (Brown and Huefner Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Aggregated over all schools	234	0.74	0.00	0.00	1.00
Doctoral schools	137	1.10	0.00	1.00	2.00
Nondoctoral schools	97	0.24	0.00	0.00	0.00

*Dependent Variable D - Top 3 Journals (Brown and Huefner Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Aggregated over all schools	234	0.49	0.00	0.00	1.00
Doctoral schools	137	0.72	0.00	0.00	1.00
Nondoctoral schools	97	0.16	0.00	0.00	0.00

** - Statistics reported in each panel are based on the self-reported frequencies at the first employing position for the 234 faculty contained in our sample. Doctoral schools (*ACCDOC* = 1) are institutions which offer doctorate degrees in accounting (either PhD or DBA). The reported statistics are based on the research output achieved at the time a tenure decision occurred. For every definition of the measured research output, doctoral schools publish significantly more ($p < 0.01$) research than nondoctoral schools.

Results

Table 1 provides descriptive statistics for each explanatory variable (n = 234 respondents with full data reported). Because research output varies considerably based on institution type (*ACCDOC*) and eventual tenure decision (*TGRAN*), further descriptive statistics are provided in Tables 2 and 3. While Table 2 partitions data based on institution type, Table 3 separates data based on the eventual tenure decision received by respondents. Table 2 shows that faculty at schools with doctoral programs in accounting publish significantly more quantity and more quality research than their peers at non-doctoral schools ($p < 0.01$). Likewise, Table 3 shows that faculty who are granted tenure at their first institution publish significantly more quantity and more quality research than their peers who did not achieve tenure at their first institution ($p < 0.01$). The observed associations between these factors, the type of institution, tenure outcome, and research output demonstrate the need to control for these factors in our regression analyses.

We report the frequency distributions of the number of faculty reporting each level of publi-

Table 3
Research Output By Type of Tenure Outcome
(Tenure Awarded/Tenure Not Awarded)

*Dependent Variable A - Total Research Output:***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Tenure awarded	112	7.55	4.00	6.00	9.00
Tenure not awarded	122	2.21	0.00	1.00	3.00

*Dependent Variable B - Top 22 Journals (Hull and Wright Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Tenure awarded	112	1.45	0.00	1.00	3.00
Tenure not awarded	122	0.67	0.00	0.00	1.00

*Dependent Variable C - Top 9 Journals (Brown and Huefner Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Tenure awarded	112	0.96	0.00	1.00	1.00
Tenure not awarded	122	0.54	0.00	0.00	1.00

*Dependent Variable D - Top 3 Journals (Brown and Huefner Rankings):***

	No. Respondents	*Average*	*Q1*	*Median*	*Q3*
Tenure awarded	112	0.66	0.00	0.00	1.00
Tenure not awarded	122	0.34	0.00	0.00	0.25

The reported statistics are based on the research output of the 234 respondents achieved at the time a tenure decision occurred. "Tenure not awarded" includes both faculty who applied for tenure but were denied and faculty who left prior to applying for tenure. For every definition of the measured research output, faculty successful at achieving tenure at their initial employing position published significantly more ($p < 0.01$) research than faculty not achieving tenure.

publication output in Table 4. Panel A of Table 4 reports the frequency distributions (by output measure) for all faculty, while Panel B reports the frequency distributions for faculty awarded tenure at their first position, partitioned by type of institution (accounting doctoral program offered or not). We find that, overall, relatively few faculty are successful at publishing in the "top-9" or the Atop-3" journals as ranked by Brown and Huefner (1994); however, faculty who are successful at achieving tenure at doctoral schools are almost four times more likely to place an article in these journals as similarly successful faculty at non-doctoral schools. With respect to the top 22 quality journals, there is a similar demarcation between doctoral and non-doctoral faculty in the type of research pursued; around 85 percent of doctoral faculty awarded tenure reported publishing at least one article in these journals, whereas almost 70 percent of the similarly successful non-doctoral faculty reported publishing nothing in these journals.

Regression Results

We present our regression results in Tables 5 and 6. The first column of each table presents the model for total publications, with each succeeding column representing increasing stringent quality measures. Table 5 reports the parameter estimates and associated *p*-values for the fully specified model. We also re-estimate the models after deleting those explanatory variables that are not significant in the full model for total publication output; we do this in order to assess the stability of the estimates of the remaining variables and to estimate a more parsimonious model. The reduced models are reported in Table 6.

Table 4
Publication Statistics at First Employing Position
Frequency Distributions

Panel A: All Respondents

	Total publications		Top 22- H&W* ranks		Top 9-B&H** ranks		Top 3-B&H ranks	
# pubs	frequency	%	frequency	%	frequency	%	frequency	%
0	61	0.26	122	0.52	134	0.57	158	0.68
1	21	0.09	44	0.19	56	0.24	47	0.20
2	21	0.09	30	0.13	23	0.10	20	0.09
3	20	0.09	20	0.09	13	0.06	8	0.03
4	19	0.08	12	0.05	7	0.03	1	0.00
5	16	0.07	4	0.02	1	0.00	0	0.00
6	18	0.08	2	0.01	0	0.00	0	0.00
>6	58	0.25	0	0.00	0	0.00	0	0.00
Totals	234		234		234		234	

Panel B: Research Output of Respondents Awarded Tenure at the First Employing Position

Non-Doctoral Schools

	Total publications		Top 22- H&W ranks		Top 9-B&H ranks		Top 3-B&H ranks	
# pubs	frequency	%	frequency	%	frequency	%	frequency	%
0	9	0.18	34	0.69	39	0.80	41	0.84
1	5	0.10	9	0.18	8	0.16	7	0.14
2	3	0.06	4	0.08	2	0.04	1	0.02
3	6	0.12	1	0.02	0	0.00	0	0.00
4	10	0.20	1	0.02	0	0.00	0	0.00
5	1	0.02	0	0.00	0	0.00	0	0.00
6	4	0.08	0	0.00	0	0.00	0	0.00
>6	11	0.22	0	0.00	0	0.00	0	0.00
Totals	49		49		49		49	

Doctoral Schools

	Total publications		Top 22- H&W ranks		Top 9-B&H ranks		Top 3-B&H ranks	
# pubs	frequency	%	frequency	%	frequency	%	frequency	%
0	1	0.02	10	0.16	15	0.24	25	0.40
1	1	0.02	15	0.24	23	0.37	20	0.32
2	0	0.00	11	0.17	9	0.14	10	0.16
3	1	0.02	14	0.22	10	0.16	7	0.11
4	5	0.08	8	0.13	5	0.08	1	0.02
5	9	0.14	3	0.05	1	0.02	0	0.00
6	9	0.14	2	0.03	0	0.00	0	0.00
>6	37	0.59	0	0.00	0	0.00	0	0.00
Totals	63		63		63		63	

*, ** - "H&W ranks" and "B&H ranks" represent the top 22 journals listed in Hull and Wright (1990) and the top 9 or top 3 journals listed in Brown and Huefner (1994), respectively.

Table 5
Poisson Regression Results
Fully Specified Models

Groups of Variables	Total Publications	Top 22 Journals	Top 9 Journals	Top 3 Journals
INTERCEPT	0.01 (0.96)	-0.94 (0.12)	-0.78 (0.30)	-0.68 (0.46)
Individually Actionable Variables:				
TIMEALLOC	-0.02 (0.00)	-0.01 (0.02)	-0.01 (0.03)	-0.02 (0.00)
ABD	0.11 (0.11)	-0.22 (0.12)	-0.20 (0.23)	-0.18 (0.40)
PROGYRS	-0.10 (0.00)	-0.07 (0.22)	-0.08 (0.23)	-0.09 (0.28)
CONSULT	0.03 (0.00)	-0.02 (0.19)	-0.03 (0.15)	-0.02 (0.33)
Faculty Actionable Variables:				
TLOAD	-0.09 (0.00)	-0.12 (0.06)	-0.18 (0.02)	-0.25 (0.01)
PREP	0.08 (0.04)	-0.04 (0.67)	-0.10 (0.39)	-0.20 (0.18)
NPREP	-0.02 (0.76)	-0.10 (0.43)	-0.20 (0.23)	-0.05 (0.80)
GRADER	-0.27 (0.00)	0.10 (0.51)	0.04 (0.83)	0.18 (0.45)
TA	-0.01 (0.91)	-0.03 (0.86)	0.00 (0.99)	-0.13 (0.61)
RSUPP	0.81 (0.00)	0.96 (0.00)	1.22 (0.00)	0.94 (0.04)
MENT	0.27 (0.00)	0.26 (0.14)	0.32 (0.12)	0.25 (0.34)
YRSTRK	0.15 (0.00)	0.14 (0.00)	0.12 (0.01)	0.11 (0.05)
Control Variables:				
GEN	-0.12 (0.16)	-0.20 (0.28)	-0.18 (0.42)	-0.09 (0.74)
TGRAN	0.90 (0.00)	0.39 (0.01)	0.20 (0.26)	0.20 (0.37)
ACCDOC	0.51 (0.00)	0.63 (0.00)	0.64 (0.01)	0.49 (0.11)
PHDQUAL	-0.20 (0.02)	0.54 (0.00)	0.45 (0.01)	0.70 (0.00)
MENTDOC	-0.02 (0.78)	0.06 (0.65)	-0.07 (0.71)	0.16 (0.45)
ACCTEACH	-0.06 (0.41)	-0.22 (0.11)	-0.18 (0.28)	-0.17 (0.42)
ACCWORK	0.19 (0.01)	0.11 (0.49)	0.17 (0.36)	0.23 (0.33)
Model Statistics:				
Chi square (*p*-value)	757.5 (0.00)	217.9 (0.00)	167.6 (0.00)	132.9 (0.00)
Likelihood ratio index	0.598	0.464	0.440	0.440

Table values not in parentheses represent the parameter estimates from a Poisson regression model containing the table variables. The values in parentheses represent the two-tailed *p*-values associated with the test of whether the particular parameter differs from zero. Model variables are defined in the body of the paper, while the publication counts represent the dependent variables in the models.

Fully-Specified Model. Table 5 presents the result of our regression analyses for the fully specified model containing the four individually-actionable factors, the eight faculty-actionable factors and the seven control variables.[12] All four models are highly significant, but some general observations can be made based on the signs and significance levels of the explanatory variables. From the standpoint of *individually-actionable factors*, only a misallocation of time relative to the institution's expectations appears to have a consistent effect across the measures of publication output. Individuals who spend relatively less time on research than expected by their institution tend to have fewer publications, regardless of the output measure. The choice to leave ABD has no impact on any measure of output, while taking longer to complete the doctorate appears to reduce total output, but not quality output. Consulting work at the first position has a positive effect on total output, but does not increase quality output.

With respect to *factors actionable by the faculty*, consistently important factors are low teaching loads, the availability of research support, and longer probationary periods before applying for tenure. In each case, these factors are associated with higher total output and higher quality output, regardless of dependent variable choice. Mentor relationships at the employing school resulted in higher total output, but are not associated with significantly higher levels of quality research output. Two anomalous findings were a *negative* association between total output and having a grader and a *positive* association between total output and number of preps; however, these results disappear when the levels of quality output are considered.

The *control factors* presented only a few surprises. Similar to the findings presented in Table 2, faculty at doctoral schools generally produce significantly higher total output and higher quality output. However, tenure award seems to reflect a possible tradeoff between quality and quantity, since the model indicates that tenure award was not associated with the number of articles published in the top tier of journals. Higher quality doctoral training is associated with *lower* total output, but *higher* quality output, suggesting a difference in research focus for these individuals. Prior accounting teaching experience had no effect on the level of output. Prior accounting work experience is associated with increased total output, but not quality output; this may reflect the value of institutional knowledge in publishing in practitioner-level journals. Finally, mentor relationships established in the doctoral program do not translate into either higher total output or higher quality output.

Reduced Model. We re-estimate our four models after dropping five variables that were not significant in the full model. Specifically, we eliminated *ABD*, *NPREP*, *TA*, *MENTDOC*, and *ACCTEACH* because these factors were not significant at conventional levels. Table 6 reports the parameter estimates and associated test statistics for our reduced models. Our resulting inferences are essentially unchanged from those discussed with the full model, although, depending on the quality measure, both the number of preps and the presence of a mentor relationship at the employing institution are marginally significant and carry their expected signs. Performing outside consulting work tends to be negatively associated with the amount of higher quality output.

Discussion

In general, our empirical results are consistent with the reported perceptions documented in Cargile and Bublitz (1986) and Chow and Harrison (1998), and with the empirical results reported by Fogarty and Ruhl (1997). Consistent with Cargile and Bublitz and Chow and Harrison, supporting faculty research efforts with additional remuneration and/or more release time from teaching is associated with dramatically improved research output, regardless of how output is measured. Consistent with Fogarty and Ruhl, higher research expectations at the employing institution and higher quality doctoral training have large positive effects on research output in the higher quality journals. We also demonstrate that individual faculty members' allocation of time toward research over and above their respective institution's expectations is also important in increasing research output, and that the number of course preparations and performing outside consulting work may negatively impact high-quality output. Our work contributes significantly to the accounting literature by incorporating all of these factors and more into an empirical model of research output and then demonstrating that these factors and others contribute jointly and incrementally to actual research output.

The results of our research confirm that the available research facilitators that comprise the current option set offered by institutions do provide incentives and resources for faculty to generate research output. However, no prior re-

Table 6
Poisson Regression Results
Reduced Models

Groups of Variables	Total Publications	Top 22 Journals	Top 9 Journals	Top 3 Journals
INTERCEPT	-0.08 (0.75)	-1.28 (0.03)	-1.24 (0.08)	-0.78 (0.37)
Individually Actionable Variables:				
TIMEALLOC	-0.01 (0.00)	-0.01 (0.03)	-0.01 (0.05)	-0.02 (0.00)
PROGYRS	-0.09 (0.00)	-0.07 (0.17)	-0.08 (0.23)	-0.09 (0.24)
CONSULT	0.03 (0.00)	-0.02 (0.09)	-0.03 (0.10)	-0.03 (0.24)
Faculty Actionable Variables:				
TLOAD	-0.09 (0.00)	-0.13 (0.04)	-0.18 (0.02)	-0.27 (0.01)
PREP	0.07 (0.04)	-0.09 (0.29)	-0.18 (0.08)	-0.23 (0.09)
GRADER	-0.27 (0.00)	0.09 (0.55)	0.02 (0.91)	0.15 (0.50)
RSUPP	0.79 (0.00)	0.95 (0.00)	1.24 (0.00)	0.92 (0.04)
MENT	0.26 (0.00)	0.30 (0.06)	0.32 (0.08)	0.30 (0.19)
YRSTRK	0.14 (0.00)	0.15 (0.00)	0.13 (0.00)	0.12 (0.03)
Control Variables:				
TGRAN	0.91 (0.00)	0.45 (0.00)	0.27 (0.12)	0.24 (0.27)
ACCDOC	0.50 (0.00)	0.65 (0.00)	0.65 (0.01)	0.47 (0.12)
PHDQUAL	-0.20 (0.01)	0.53 (0.00)	0.43 (0.02)	0.67 (0.00)
ACCWORK	0.18 (0.01)	0.04 (0.81)	0.13 (0.46)	0.17 (0.43)
Model Statistics:				
Chi square (*p*-value)	752.8 (0.00)	210.7 (0.00)	162.6 (0.00)	130.3 (0.00)
Likelihood ratio index	0.596	0.436	0.431	0.419

Table values not in parentheses represent the parameter estimates from a Poisson regression model containing the table variables. The values in parentheses represent the two-tailed *p*-values associated with the test of whether the particular parameter differs from zero. Model variables are defined in the body of the paper, while the publication counts represent the dependent variables in the models.

search that we are aware of has actually documented the so-called "conventional wisdom" that these factors actually lead to additional output or has addressed the issue of individual incremental productivity improvements that derive from these factors. Our research provides this evidence.

Given the increasing research expectations in university settings over time (see, e.g., Read et al. 1998; Schultz et al. 1989), we view our contribution as intra-institutional guidance for increasing research output. From an administrative standpoint, schools considering revising research quantity expectations upward for tenure award should also consider making additional resources available, allowing a tradeoff between quality and quantity of output, lowering teaching loads, and extending the length of the probationary period. For example, establishing a mentor relationship with a senior faculty member should help the junior faculty member increase his or her output by more than 30 percent.[13] On the other hand, there are implications for individual choices as well. For example, assume a department expects junior faculty to devote 60 percent of their time to research. Holding other factors constant, a junior faculty member who then devotes only 40 percent of his or her time to research would be expected to achieve less than 70

percent of the research level for properly allocated time.[14] Similar recommendations can be made if the objective is to increase faculty members' publications in the higher-quality, upper-tier accounting research journals.

Our study is subject to a number of limitations. First, our data are based on self-reports from respondents whose anonymity was strictly maintained when recording their responses. As such, we are unable to verify much of the self-reported publication data against external databases. However, the observed publication frequency distributions in our study do not appear to differ dramatically from those reported by Read et al. (1998) when we examine the highest quality measures. Second, faculty initial employed at doctoral schools are over-represented in our sample, thus raising some questions about a response bias and the generalizability of our results.[15] Whether this induces a bias into our results pertaining to the influence of the explanatory factors is unclear. For example, our respondents may represent primarily productive faculty, while unproductive faculty having access to similar option sets may have chosen not to respond. However, given our previous observations about the frequency distributions of publications, we believe that any response bias is small. Third, our data are somewhat dated (being solicited in 1992) and may not reflect the possibly different option sets (i.e., additional release time, increased research support, etc.) that characterize the academic environment today. However, based on our personal experience and on the results documented in Chow and Harrison, we do not believe that available option sets or research facilitators have significantly changed over the last six to eight years even in the face of increased research expectations. If anything, these research facilitators may have become more widespread in accounting academia, but they have not changed their essential form. In this case, our results have some enduring value in guiding the decisions of individual faculty and administrators. Further, when compared to the time periods represented in other recently published articles on faculty productivity, there is a great deal of overlap (see, e.g., Fogarty and Ruhl 1997, Rama et al. 1997, Read et al. 1998, and Chow and Harrison 1998), suggesting some degree of comparability between studies. Even though there are differences in the faculty included in this diverse set of studies, we suggest that our work complements these studies and gives a broader view of the determinants of research productivity. In any case, even if time periods are not strictly comparable, and even if unproductive faculty are under-represented in our respondents, identifying associations between specific factors and the types of research output is important to making an informed judgment with respect to the tradeoffs necessary to increase research productivity.

Suggestions for Future Research

The limitations identified above suggest several potential areas for future research. First, as Read et al. (1998) have noted, research expectations have increased at non-doctoral institutions over the past decade. If these schools have incorporated option sets that facilitate the increased research expectations, then there will be a congruency between expectations and resources. If, on the other hand, additional resources for research support have not been forthcoming, these schools may experience difficulty in recruiting new faculty who are sufficiently trained to publish more and better research. Additional research is therefore needed to determine the currently available option sets that characterize non-doctoral schools and to assess the "resource availability-publication return" relationship at these schools. Second, option sets may have significantly changed over the past decade in ways that are not reflected in our survey. This suggests that this study should be replicated using more recent data. Finally, it might be useful in a follow-up study to focus on specific subgroups of faculty to determine if the availability of resources differentially impacts the productivity of these subgroups relative to the sample as a whole. This implies estimating similar models

separately for each group, which would relax the existing constraint that the regression coefficients for the faculty actionable and individually actionable factors remain constant across the subgroups. Richer insights into faculty publishing success might be gained as a result.

We thank Austin Reitenga, Philip Reckers, David Stout, Ronald C. Clute (the editor), and workshop participants at the 1998 AAA Annual Meeting for comments on earlier versions of this paper.

Endnotes

1. Cargile and Bublitz 's questionnaire (circa 1983) investigated the importance of 20 potential "research facilitators." Computer access, data base access, and typing support were rated 1st, 6th, and 8th, respectively. Fogarty and Ruhl (1997) examine only the association between research output and the quality of the doctoral-granting institution and the research orientation of the employing institution.
2. While the information from our survey is somewhat dated, it is obtained from a group of faculty upon which a number of recently published studies have focused (see, e.g. Fogarty and Ruhl 1997, Collins et al. 1998). While a specific comparison is not possible, many of the faculty surveyed in Chow and Harrison (1998) and Fogarty and Ruhl are likely to have begun their careers in the period that we examine.
3. Analysis of the respondents and nonrespondents suggested that faculty who were at a doctoral-granting institution at the time of the survey are over-represented in the sample relative to the overall population of accounting faculty ($p < 0.01$). The two groups did not differ across year of PhD award ($p = 0.78$). With respect to the respondents who were deleted from the analysis sample due to missing data, additional analyses revealed no significant differences in self-reported research output when compared to respondents included in the analysis sample.
4. We focused on research output at the first institution in order to reduce noise in our output measure. This could occur for at least two interrelated reasons. First, subsequent employing institutions are likely to have different resources and expectations than the initial institution. Second, faculty moving to other schools are likely to have a number of research projects in progress that were actually begun at the first employing institution.
5. We did not insist that the total number of refereed publications provided by respondents reconcile to the list of specific journals they produced. In 79 percent of the responses, the total number of publications reconciles to within one publication of the number of listed journals (83 percent to within two publications). To the extent that respondents did not list quality journal publications (defined along the three dimensions discussed in this section), our quality estimates are downwardly biased. We do not view this as a severe problem because (1) all respondents with refereed publications listed some specific journals; (2) it is unlikely that authors would omit listing their quality publications; (3) the vast majority of affected surveys were for respondents reporting six or more total publications; and (4) our observed publications frequency distribution for promoted faculty at doctoral schools publishing in the highest quality journals is roughly similar to that reported in Panel A of Table 3 in Read et al. (1998). This suggests little error in self-reported number of "top-3" journal publications, with potentially greater error in the measure of the number of "top-22" publications.
6. The top nine academic journals (in descending rank order) were *The Accounting Review; Journal of Accounting Research; Journal of Accounting and Economics; Contemporary Accounting Research; Accounting, Organizations and Society; Accounting, A Journal of Practice & Theory; The Journal*

of the American Taxation Association; Journal of Accounting and Public Policy; and Journal of Accounting, Auditing, and Finance.

7. Similar to Fogarty and Ruhl (1997), we do not distinguish between single- and co-authored research.
8. A complete copy of our survey is available from the authors upon request.
9. The square-root transformation was used to reduce the extreme skewness in the distribution of reported consulting hours. Similar results are obtained using the un-transformed variable in our model.
10. We adjusted respondents self-reported teaching load from quarter-hours to semester-hours by multiplying the quarter-hours by 2/3. This adjusts the different teaching loads to a more comparable metric.
11. Schroeder and Saftner (1989) established "top ten" rankings of institutions for academic research productivity and for quality graduate institutions. As similarly used by Pirozzoli et al. (1993), we considered the 18 institutions identified in these two rankings to be "prestige" institutions.
12. As a specification check on the use of the nonlinear Poisson regression model in either the full or reduced specifications, publication frequency counts were subjected to a square-root transformation and the models re-estimated using ordinary least squares with the White (1980) correction for heteroskedasticity. This transformation also has the result of reducing the influence of any extraordinarily productive faculty. Similar results as those reported in the tables were obtained.
13. The estimated model is nonlinear, so that $E[y_i|x_i] = e^{\beta' x_i} = (e^{\beta_0}) \bullet (e^{\beta_1 x_1}) \bullet (e^{\beta_2 x_2}) \bullet \ldots \bullet (e^{\beta_k x_k})$ represents the functional form of the model, where β_i represents the parameters and x_i the explanatory variables. To illustrate quantifying the effects, consider the impact of a mentor at the employing institution on total research output. Since the parameter estimate is 0.27 (see Table 5) and *MENT* is coded 1, the effect on total research output, holding all other factors constant, is given by $e^{[0.27(1)]} = 1.31$, which suggests an increase in output of 31 percent.
14. In this situation (*TIMEALLOC* = 60 – 40 = 20), where the parameter estimate is -0.02 (see Table 5), the effect on total research output, holding all other factors constant, is given by $e^{[-0.02(20)]} = 0.67$, which suggests a decrease in output of 33 percent.
15. A majority of the respondents included in our analyses were initially employed at doctoral schools, whereas other research suggests that only about one in three initially begin their careers at doctoral schools (Collins et al. 2000).

References

1. Bublitz, B. and R. Kee, "Measures of Research Productivity" *Issues in Accounting Education*, pp. 39-60, 1984.
2. Brown, L. D. and R. J. Huefner, "The Familiarity with and Perceived Quality of Accounting Journals: Views from Senior Accounting Faculty in Leading U.S. MBA Programs," *Contemporary Accounting Research*, Summer, pp. 223- 250, 1994.
3. Campbell, D. R. and R. G. Morgan, "Publication Activity of Promoted Accounting Faculty," *Issues in Accounting Education*, Vol. 2, Spring, pp. 28-43, 1987.
4. Cargile, B. R. and B. Bublitz, "Factors Contributing to Published Research by Accounting Faculties," *The Accounting Review*, Vol. 61, January, pp. 158-178, 1986.
5. Carolfi, I., C. M. Pillsbury and J. R. Hasselback, "The Hiring of Women in Accounting Academia," *Journal of Education for Business*, January-February, pp. 151-156, 1996.
6. Chow, C. W. and P. Harrison, "Factors Contributing to Success in Research and Publications: Insights of 'Influential' Accounting Authors," *Journal of Accounting Education*, Vol. 16, No. 3/4, pp. 463-472, 1998.
7. Collins, A. B., B. K. Parrish and D. L. Collins, "Gender and the Tenure Track: Some Survey Evidence," *Issues in Accounting Education*, Vol. 13, May, pp. 277-299, 1998.
8. Collins, D., A. Reitenga, A. Collins and S. Lane, "'Glass walls' in Academic Accounting? The Role of Gender in Initial Employment Position," forthcoming in *Issues in Accounting Education*, 2000.

9. Dwyer, P. D., "Gender Differences in the Scholarly Activities of Accounting Academics: An Empirical Investigation," *Issues in Accounting Education*, Vol. 9, Fall, pp. 231-246, 1994.
10. Englebrecht, T. D., G. S. Iyer and D. M. Patterson, "An Empirical Investigation of the Publication Productivity of Promoted Accounting Faculty," *Accounting Horizons*, March, pp. 45-68, 1994.
11. Fogarty, T. J. and J. M. Ruhl, "Institutional Antecedents of Accounting Faculty Research Productivity: A LISREL Study of the 'Best and Brightest'," *Issues in Accounting Education*, Vol. 12, Spring, pp. 27-48, 1997.
12. Greene, W. H., *Econometric Analysis*, 2nd edition, Macmillan Publishing, New York, 1993.
13. Hagerman, R. L. and C. M. Hagerman, "Research Promotion Standards at Selected Accounting Programs," *Issues in Accounting Education*, Vol. 4, Fall, pp. 265-279, 1989.
14. Hasselback, J. R., *Accounting Faculty Directory*, Prentice-Hall, Englewood Cliffs, New Jersey, 1992.
15. Heck, J. L., R. P. Derstine and R. J. Huefner, *Accounting Literature Index*, McGraw-Hill, New York, New York, 1994.
16. Henderson, G. V., Jr., G. K. Ganesh and P. R. Chandy, "Across-discipline Journal Awareness and Evaluation: Implications for the Promotion and Tenure Process," *Journal of Economics and Business*, Vol. 42, pp. 325-351, 1990.
17. Hull, R. P. and G. B. Wright, "Faculty Perceptions of Journal Quality: An Update," *Accounting Horizons*, Vol. 4, March, pp. 77-98, 1990.
18. Jacobs, F., A. Hartgraves and L. Beard, "Publication Productivity of Doctoral Alumni: A Time-adjusted Model," *The Accounting Review*, January, 179-187, 1986.
19. Maranto, C. L. and C. A. Streuly, "The Determinants of Accounting Professors' Publishing Productivity The Early Career," *Contemporary Accounting Research*, Vol. 10, pp. 387-407, 1994.
20. Milne, R. A. and G. A. Vent, "Publication Productivity: A Comparison of Accounting Faculty Members Promoted in 1981 and 1984," *Issues in Accounting Education*, Vol. 2, Spring, pp. 94-111, 1987.
21. Pirozzoli, I., C. M. Pillsbury and J. R. Hasselback, "A Look at Gender Hiring and Promotion Patterns in Accounting Academia," Unpublished working paper, 1993.
22. Rama, D. V., K. Raghunandan, L. B. Logan and B. V. Barkman, "Gender Differences in Publications by Promoted Faculty," *Issues in Accounting Education*, Vol. 12, Fall, pp. 354-365, 1997.
23. Read, W. J., D. V. Rama, and K. Raghunandan, "Are Publication Requirements for Accounting Faculty Promotions still Increasing?," *Issues in Accounting Education*, Vol. 13, May, pp. 327-339, 1998.
24. Reinstein, A. and J. R. Hasselback, "A Literature Review of Articles Assessing the Productivity of Accounting Faculty Members," *Journal of Accounting Education*, Vol. 15, No. 3, pp. 425-455, 1997.
25. Saftner, D. V., "The Promotion of Academic Accountants," *Journal of Accounting Education*, Vol. 6, pp. 55-65, 1988.
26. Schroeder, N. W. and D. V. Saftner, "Accounting Faculty Promotion at Quality Institutions," *Issues in Accounting Education*, Vol. 4, Fall, pp. 252-264, 1989.
27. Schultz, J. J., Jr., J. A. Meade and I. Khurana, "The Changing Roles of Teaching, Research, and Service in the Promotion and Tenure Decisions for Accounting Faculty," *Issues in Accounting Education*, Vol. 4, Spring, pp. 109-119, 1989.
28. Streuly, C. A., and C. L. Maranto, "Accounting Faculty Research Productivity and Citations: Are There Gender Differences?" *Issues in Accounting Education*, Vol. 9, Fall, pp. 247-258, 1994.
29. White, H., "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity," *Econometrica*, May, pp. 817-838, 1980.