Title

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Journal

Research in Higher Education, 45(7)

ISSN

0361-0365

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Publication Date

2004-11-01

DOI

10.1023/b:rihe.0000044229.70457.ca

Research in Higher Education, Vol. 45, No. 7, November 2004 (© 2004)

FACULTY ENTREPRENEURIALISM AND THE CHALLENGE TO UNDERGRADUATE EDUCATION AT RESEARCH UNIVERSITIES

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This study attempts to unravel the complex relationships between faculty entrepreneurialism and teaching. Specifically, this study (1) compares the extent of entrepreneurial activities (i.e., using funds for research and consulting activity) across disciplinary fields and levels of teaching commitment and (2) examines the relative effects of faculty entrepreneurialism on commitment to teaching. Using a national database of four-year college faculty, research findings demonstrate variations of teaching commitment with respect to disciplinary fields and forms of entrepreneurial activities. More important, this study reveals rather strong negative relationships between using funds for research and teaching commitment. Such findings have important implications for policy makers, administrative leaders, and university faculty as they seek to balance the institution's instructional mission in light of the increasing trend toward entrepreneurialism.

KEY WORDS: college faculty; entrepreneurialism; teaching; research universities; faculty research; faculty work; academic labor; undergraduate education.

INTRODUCTION

Faculty entrepreneurialism, which we define as the effort of faculty to generate revenue for themselves or for their institutions, has become an essential feature of most research universities in the United States (Fairweather, 1988, 1989; Powers, 2003). Although faculty entrepreneurialism is hardly a new idea, the extent and impact is arguably greater today than at any previous point in U.S. history (Slaughter and Leslie, 1997), and although entrepreneurial activity is likely to increase the research capacity of universities, there is some concern that such endeavors may

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0361-0365/04/1100-0739/0

threaten the quality of and commitment to undergraduate education (Fairweather, 1988; Slaughter and Leslie, 1997). Such concerns are particularly germane to research universities, given the tremendous emphasis placed on research, combined with the fact that research universities also embrace the social responsibility of providing quality undergraduate education. Consequently, the rising prevalence of entrepreneurial activity may result in increased conflicts of interest in which revenue-generating activities are weighed against quality undergraduate education.

Higher education scholars tend to look to the 1980s and 1990s as a key period in the intensification of entrepreneurialism, which was most forcefully advanced through an increase in university–industry alliances and a more aggressive push to commercialize research (Campbell and Slaughter, 1999; Fairweather, 1988, 1996). Slaughter and Leslie (1997), for instance, note an increase of non-governmental funds from 29.9% in 1969–1970 to 32.8% in 1984–1985. Geiger and Feller (1995) point out that industry's financial share of sponsorship of academic research rose from 3.8% in 1979–1980 to 6.7% in 1989–1990, while the federal government's share fell from 67.3 to 58.8%. Additionally, the commercialization of faculty research appears to be rapidly expanding. Powers (2003) notes that a sample of 64 top research universities saw the licensing of patented technologies more than double between 1991 and 1997. Similarly, Francis and Hampton (1999) observe a general shift at public research universities toward the generation of market-driven revenues during the first half of the 1990s.

There are many explanations offered for such an entrepreneurial turn, including a shift toward a global, free-market economy, an increase in demands for applied research, and a relative decrease in state expenditures for higher education (Breneman, 1993; Rhoads, 2003; Slaughter, 1990; Slaughter and Leslie, 1997). State lawmakers, meanwhile, have openly encouraged public research universities to collaborate with private enterprise as a means both to support universities and to promote economic development (Basinger, 2001; Schmidt, 2002). Private research universities are faced with growing pressure to generate additional revenues, especially in light of the economic downturn of the early 2000s (Pulley, 2002; Van Der Werf, 2002). Entrepreneurialism has become so embedded within the culture of the academy that faculty success in generating external revenue inevitably raises their status and prestige as well as that of the institution (Slaughter and Leslie, 1997; Stigler, 1993). This turn toward entrepreneurial activity has brought with it a central focus on markets and the university as a highly competitive economic enterprise.

Although the trend toward increased faculty entrepreneurialism certainly has the potential to increase financial support for research universities, it is not without criticism. University leaders and faculty alike worry that excessive entrepreneurialism may threaten an institution's instructional commitments and thus compromise the overall mission of research universities. Given the push for faculty to seek financially profitable activities, many are concerned that undergraduate instruction is taking a back seat (Fairweather, 1989, 1996; Slaughter and Leslie, 1997).

With the preceding concerns in mind, we utilize a national survey of teaching faculty to explore the extent to which entrepreneurial behaviors impact one's commitment to teaching. Our concern is that increased pressure to engage in entrepreneurial activities poses new challenges for faculty seeking to contribute meaningfully to the educational mission of their institutions. Ultimately, our interest is in how research universities might fulfill their role as socially responsible universities in which their research capacity is strong, but teaching also is highly valued (Astin, 2001; Boyer, 1990; Fairweather, 1996, 2002; Tierney, 1998, 1999).

Entrepreneurialism: Friend or Foe?

Entrepreneurial activities can produce many benefits, such as enhanced relations with outside bodies, the potential for institutional and individual prestige, employment and recruitment opportunities for students and graduates, and enhanced scientific and research equipment, to name just a few (Slaughter and Leslie, 1997). The social good arguably is served as entrepreneurial activities often provide practical ways of fulfilling the university's research mission. Some may even consider entrepreneurial research as a form of public accountability; working in collaboration with corporate and industry partners challenges professors to engage in research that is of utmost concern to economic productivity (Campbell and Slaughter, 1999; Fairweather, 1988). Whether building closer ties to the corporate/industry sector, tapping into federal sources of support, developing patents, or pursuing consulting opportunities, faculty entrepreneurialism has evidenced the kind of innovative spirit that has long been a marker of U.S. economic success (Anderson, 2001).

Entrepreneurialism is particularly beneficial for institutions confronted with decreasing revenue. Faculty at research universities who bring in substantial funds can subsidize an institution's operating costs and administrative salaries, allowing a university to maintain its course or even thrive in the midst of declining endowment income and/or government cutbacks. In one typical case of a public research university, a department

receives an extra $222 in state revenue for every $1000 in grants that its faculty generate. Given that one-third of a university's operating budget often is comprised of federal grants and contracts, departmental resources can multiply substantially (Volk, Slaughter, and Thomas, 2001). In many science fields entrepreneurial activities help subsidize costly laboratory equipment and maintenance, at both publics and privates, thus supplying necessary resources for carrying out the instructional mission of the university.

University–industry collaborations may also benefit students directly as such partnerships often lead to tighter linkages between preparation programs and the needs of industrial and corporate sectors. Through internships, summer jobs, and increases in industry-minded faculty and industry-influenced curricula, the development of human capital for industrial/corporate purposes is enhanced significantly. Students with hands-on technical instruction and experience become more competitive employment prospects. Graduate students especially can benefit in terms of both financial support and training by participating with faculty in externally funded research activities.

Entrepreneurial activities are not without their criticism. With increased partnerships between universities and private-sector forces come significant ethical questions revolving around conflicts of interest (Anderson, 2001; Blumenthal, Campbell, Causino, and Louis, 1996; Campbell and Slaughter, 1999). One example of an ethical problem is that increased corporate ties may lead faculty to compromise research objectivity and practices (Bekelman, Li, and Gross, 2003; Blumenstyk, 2002). Such conflicts of interest are more likely outcomes as faculty research becomes a commodity for sale on the open market (Altbach, 2001), and as research universities increasingly hold equity in companies that sponsor research (Bekelman et al., 2003). Evidence of the commodification of academic work includes the sophisticated efforts of universities to monitor faculty research in science and technology fields as institutions seek lucrative patents and license agreements (Blumenstyk, 2002). Questions about the dissemination of funded research findings also arise, leading to conflicts of social vs. proprietary claims on knowledge (Anderson, 2001). There also is concern that basic research may become marginalized in light of revenue-generating research with direct application to corporate or industrial use (Resnik, 1996).

Entrepreneurial Activities and Teaching

One major conflict of interest that has received considerable attention concerns whether or not faculty are able to maintain a commitment to the

teaching role while engaging in entrepreneurial activities (Fairweather, 1996, 2002; Slaughter and Leslie, 1997). At the institutional level, the extent of commitment to undergraduate education becomes quite convoluted. The concern here is not limited to institutional policies (i.e., faculty course release policies or teaching requirements), but the underlying commitment to teaching and student learning. Institutional commitment to undergraduate education is not always evident by institutional policies. Universities quite easily can release entrepreneurial faculty of teaching loads and hire less qualified substitute lecturers, adjuncts, doctoral students, and other part-time instructors and on the surface convey a commitment to the educational mission. By releasing full-time faculty to engage in entrepreneurial endeavors and then hiring relatively inexpensive replacements, a given department may actually benefit financially by being less committed to student learning. But while departments may save considerable money by hiring part-time replacement faculty, they also may compromise the quality of instruction (Fairweather, 1989).

On the individual level, faculty commitment to student learning is no less conflicted. Although faculty, on average, have expressed a high value and satisfaction in teaching (Leslie, 2002), the greater external rewards for research, particularly funded research, can potentially create a conflict of interest. For instance, combining research (i.e., the number of publications and the number of conference presentations/exhibitions) and funds (i.e., serving as a principal investigator on an externally funded project and total research funds) as a single "research" measure, Fairweather (2002) found that only 22% of university faculty were productive in both teaching and research, whereas about 50% of faculty in research universities were productive in either research *or* teaching. Campbell and Slaughter (1999) warned that disparities between entrepreneurial and non-entrepreneurial faculty will continue to widen, with entrepreneurial faculty engaging in university–industry activity and non-entrepreneurial faculty involved with traditional academic duties (i.e., teaching and attention to students). Entrepreneurial faculty are likely to increase in status and prestige, while the status of non-entrepreneurial faculty will diminish (Campbell and Slaughter, 1999).

Faculty *consulting* activity has been studied as a possible threat to the institutional instruction. Marsh and Dillon (1980) report that the amount of supplemental income earned by consulting activities is positively associated with research productivity (i.e., publishing books and articles), but negatively associated with teaching activities (i.e., hours per week actually teaching) and teaching commitment (i.e., primary interest in teaching). Perna (2002) also finds that the percentage of time faculty devote to teaching lessens the probability of receiving consulting

earnings. Although Braxton and Hargen's (1996) extensive review of the literature proposes that research productivity does not conflict with teaching effectiveness, we offer that the quest for revenue, as a particular dimension of academic labor, can negatively affect one's teaching commitment.

As a consequence of increased entrepreneurialism, undergraduate and graduate students can be directly and negatively affected. As faculty increase their participation in industry or consulting activities, they may be absent from the university community for extended periods of time. Graduate students working on funded projects potentially can be exploited as results often are delayed or withheld, thereby hindering any promise of dissertation completion or research publications (Bartlett, 1988; Blumenthal, Campbell, Anderson, Causino, and Louis, 1997). As industry/corporate partnerships lead to tighter connections between curricular offerings and corporate needs, ideas and interests that exist in opposition to the corporate arena may become increasingly marginalized and absent from the student experience (Nelson and Bérubé, 1995).

A concern addressed by our study is the degree to which entrepreneurial activities affect faculty commitment to teaching. We see teaching in particular and undergraduate education in general as a major portion of the social good that *all* universities traditionally have been chartered to serve (Benjamin, 1995; Bérubé and Nelson, 1995). Such a view suggests that universities are significantly different from other types of organizations. As Tierney (1999) maintained:

> The university's mission is different from that of a company whose sole purpose is to develop a good product and turn a profit. In a postsecondary institution, we come together to help educate students and one another. We aim to help students gain some insight into how they understand the world for themselves. Our purpose is not to sell an idea, market a product, or inculcate individuals with a particular worldview. We aim to equip students with the intellectual and technical skills necessary to function effectively in a democracy. (p. 12)

In essence, any institutional activity that compromises the university's teaching mission should be weighed carefully.

Disciplinary Differences

A study such as this is incomplete without addressing disciplinary differences. Previous research has well demonstrated that the discipline is a source of identity in the professional lives of faculty members (Becher, 1989; Clark, 1987; Ladd and Lipsett, 1975; Lee, 2004; Smart, Feldman, and Ethington, 2000) and can produce variations in faculty priorities (Smart and McLaughlin, 1974), reward structures (Smart and McLaughlin, 1978), social and epistemological orientations (Becher, 1989), and

political attitudes (Ladd and Lipsett, 1975). As it relates to our study, past research also finds that faculty research revenue varies considerably by disciplinary field (Fairweather, 2002).

Relatively few research dollars, in fact, are channeled to the humanities and fine arts departments. Engineering, Health Sciences, and Natural Sciences faculty obtain substantially more research funding than Fine Arts and Humanities faculty (Fairweather, 2002). These hard and applied science faculty also tend to generate more supplemental income for consulting activities than non-science faculty (Boyer and Lewis, 1985; Kirshstein, Matheson, Jin, and Zimbler, 1997) and, as such, much of the research related to faculty entrepreneurialism has focused on faculty in the hard and applied sciences (Bartlett, 1988; Blumenthal et al., 1997; Campbell, Louis, and Blumenthal, 1998; Resnik, 1996). Although we can safely assume that entrepreneurial activity tends to take place in greater quantity within the hard and applied sciences, how specific forms of entrepreneurial activity (i.e., consulting/freelance activity and using funds for research) differ by discipline remain less clear.

RESEARCH DESIGN

Based on the growing body of inquiry on faculty entrepreneurialism and particularly the forewarnings offered by Campbell and Slaughter (1999), regarding the entrepreneurial and non-entrepreneurial faculty split, we center our study on the following research questions:

1. How do entrepreneurial activities differ by disciplinary field?
2. Is there a difference between entrepreneurial and non-entrepreneurial faculty when it comes to their commitment to teaching?
3. To what extent do faculty entrepreneurial behaviors relate to their teaching commitment?

Data Source

The primary data source for this study is "The 2001 Faculty Survey," a national survey of teaching faculty collected during the fall and winter of 2001 and 2002 (Lindholm, Astin, Sax, and Korn, 2002). The faculty surveys were collected as part of the Cooperative Institutional Research Program (CIRP), a national longitudinal study of the U.S. higher education system. CIRP is administered by the Higher Education Research Institute (HERI) at the University of California, Los Angeles. The survey instrument included demographic and biographic information,

and especially focused on questions related to faculty behaviors, professional priorities, perceptions of the institution, and satisfaction ratings. The primary database for this study included survey responses from over 20,000 faculty members at 68 public and private research universities nationwide (Carnegie Classification: Research I & II and Doctoral I & II).

Supplemental data on institutional characteristics were obtained from HERI and the 1997 Integrated Postsecondary Education Data System (IPEDS) data conducted by the U.S. Department of Education. Institutional variables added to the data file included items related to institutional classifications, size, expenditures, and revenue.

Descriptive Data Analyses and Variables

The dependent variable for this study was faculty *Commitment to Teaching*. The items that comprised this composite measure included *Importance of Being a Good Teacher* and *Reason for Career: Opportunity for Teaching* (alpha = .62) (see Appendix A for Variables and Coding Scheme). The same composite measure was used in previous research in which the alpha was .71 (Lee, 2004). Although the alpha score is relatively low, faculty *Commitment to Teaching* serves as a reasonable proxy for evaluating an individual's commitment to undergraduate education, given that the vast majority of instruction takes place at the undergraduate level.

Two variables served as forms of entrepreneurial activity. First, *Hours per Week: Outside Consulting/Freelance Work* was recoded into a dichotomous variable, *Consulting Activity*, because a preliminary frequency analysis showed that the majority of faculty do not engage in any consulting or freelance work (63.1%). Consulting is considered a major form of entrepreneurial activity (Bird and Allen, 1989; Slaughter and Leslie, 1997) that nevertheless, has received limited attention (Fairweather, 1988). Another form of entrepreneurial activity, *Used Intra- or Extramural Funds for Research*, was also examined. Although it was not possible to distinguish whether a faculty member used one type of funding vs. the other, this variable aligned well with the purposes of this study, because it represents efforts to garner revenue for oneself or for the institution.

To address the first question of our study, we conducted cross tabulations in order to compare the extent of faculty entrepreneurial activities by disciplinary fields. The fields included *Biology*, *Business*, *Education*, *Engineering*, *English*, *Health Sciences*, *History/Political Science*, *Humanities*, *Fine Arts*, *Mathematics*, *Physical Sciences*, and *Social Sciences*. We purposely selected Biglan's (1973) disciplinary schema, which classifies disciplines into three key dimensions: (1) hard–

soft (i.e., engineering vs. humanities), (2) pure-applied (i.e., physical science vs. business), and (3) life–non-life (i.e., biology vs. mathematics), as perceived by academics in the university setting. These dimensions allow disciplines to be understood from more than one area although the exact dimensions can be examined separately. Using Biglan's schema, our fields were classified into the following eight clusters shown in the Table 1.

To address the second question of our study, we selected two groups of faculty: entrepreneurial faculty who engage in *Consulting Activity* and *Used Funds for Research* and non-entrepreneurial faculty. We then tested differences between these entrepreneurial and non-entrepreneurial faculty in relation to their *Commitment to Teaching*.

Regression Analyses and Variables

To address the main question of our study, we ran a blocked, step-wise linear regression analysis to determine the extent to which both individual-level and institutional-level entrepreneurial activities relate to faculty commitment to teaching (see Appendix B for Correlation Matrix). Our primary interest was in evaluating the possible effects of entrepreneurialism on our dependent variable, faculty *Commitment to Teaching*.

In addition to *Consulting Activity* and *Used Funds for Research*, we selected other independent variables as control measures based on possible relationships to entrepreneurialism and teaching that previous research already had uncovered. The faculty background variables comprised the first block and included *Gender* (i.e., *Female* (Fairweather, 2002), *Ethnicity* (i.e., *White/Caucasian*, *African American/ Black*, *American Indian*, *Mexican American/ Chicano*, *Asian/ Asian American*) (Fairweather, 2002), *Discipline* (i.e., *Biology*, *Business*, *Education*, *Engineering*, *English*, *Health Sciences*, *History/Political Sciences*, *Fine Arts*, *Math*, *Physical Sciences*, and *Social Sciences*) (Campbell and Slaughter, 1999; Leslie, 2002), and *Tenure Status* (Fairweather, 2002). We included disciplines as independent variables to observe the effects of entrepreneurialism on teaching beyond any disciplinary effects.

TABLE 1. Clustering of Disciplinary Fields in Biglan's Three Diemensions

	Hard		Soft	
Task Area	Non-life	Life	Non-life	Life
Pure	Mathematics, Physical Science	Biology	English, FineArt, Humanities	Political Science, Social Science
Applied	Engineering	Health sciences	Business	Education

We anticipated that institutional characteristics would play a distinct role in entrepreneurship. Thus, the second block included the following institutional characteristics: *Institutional Size* (Fairweather, 1988), *Urban Setting* (Tornquist and Kallsen, 1994), and *Institutional Research Expenditures* (Tornquist and Kallsen, 1994). We also added the following additional institutional characteristics for exploratory purposes: *Selectivity*, *Student-to-Faculty Ratio*, *Tuition Revenues*, and *Institutional Instructional Expenditures*.

The third block consisted of individual faculty characteristics related to entrepreneurialism. Entrepreneurial activity variables included *Consulting Activity* and *Used Funds for Research*.

RESULTS

Descriptive Findings

Entrepreneurial activities tend to take place most often among faculty in these Hard fields (i.e., Biology, Engineering, and Physical Sciences). Mean differences further indicate that disciplinary differences exist not only with respect to the disciplinary field, but also with regard to the form of entrepreneurial activity. That is, disciplinary differences with respect to *Consulting Activity* and *Used Funds for Research* exist. (No differences appear to exist between Life vs. Non-life fields when it comes to these particular forms of entrepreneurialism.)

Faculty in the Applied fields (i.e., Engineering, Education, Business, and Health Sciences) tend to participate in more consulting than faculty in the Pure fields (i.e., Humanities, Math, English, and Biology). These findings are fairly consistent with Kirshstein, Matheson, Jin, and Zimbler's (1997) and Boyer and Lewis' (1985) findings. Approximately 25% of Humanities faculty serve as consultants, which is noticeably less than the 52% of consulting faculty in Engineering. Engineering faculty constitute the highest percentage of paid consultants, which is noticeably greater in comparison to faculty in the other fields. The one exception is Fine Arts faculty, 51.6% of who serve as consultants, most likely as freelance artists. Nevertheless, the findings demonstrate that consulting takes place mostly in the applied fields and professional schools.

Table 2 also shows that *Using Funds for Research* varies by discipline. The highest number of faculty who use funds for research are in the Hard fields (i.e., Biology, followed by Physical Science and Engineering).

TABLE 2. Consulting Activity and Used Funds for Research by Disciplinary Groups (percentages)

Variable	Biology N = 1,272	Business N = 1,013	Education N = 1,232	Engineering N = 1,223	English N = 689	Health Sciences N = 1,639	History/ Poli Sci N = 913	Human-ities N = 1,256	Fine Arts N = 1,243	Math N = 611	Physical Sciences N = 1,355	Social Sciences N = 2,151	Chi Square
Consulting Activity	28.7	41.4	46.5	52.0	28.2	40.3	31.4	25.4	51.6	24.2	29.2	35.9	545.69 df = 14 $p \leq .000$
Used Funds for Research	90.9	54.1	59.3	83.3	56.6	72.0	69.1	57.7	51.5	55.7	86.3	74.6	1444.15 df = 1 $p \leq .000$

Interestingly enough, more Business faculty engage in more consultant work than English, History/Political Science, and Humanities faculty, but fewer Business faculty use funds for research than faculty in the same three fields Table 3.

Mean comparisons indicate a significant difference between entrepreneurial and non-entrepreneurial activity faculty's commitment to teaching. Moreover, faculty commitment to teaching varies by entrepreneurial activity. As we had anticipated, faculty who use funding toward their research are somewhat less committed to teaching than faculty who do not (see Table 3). While the differences are statistical significant, the effect size for this differences was very small (Eta squared = .02).

The findings among faculty who engage in consulting were rather unexpected. As shown in Table 4, faculty who engage in *Consulting Activity* actually score *higher* in their *Commitment to Teaching* than faculty who do not. Although these findings initially might be interpreted to mean that faculty who consult are more committed to teaching than their counterparts (faculty who do not consult), the effect size for the difference is zero. Nevertheless, the findings here demonstrate that entrepreneurial faculty are not necessarily less committed to teaching

TABLE 3. Comparing Means on Commitment to Teaching by Using Funds for Research

	Use Funds for Research	
Variable	Yes	No
Commitment to Teaching	5.86* (N = 12,825)	6.19* (N = 5808)

Note: Eta squared = .02.
*$p < .001$.

TABLE 4. Comparing Means on Commitment to Teaching by Consulting Activity

	Consulting Activity	
Variable	Yes	No
Commitment to Teaching	6.02* (N = 13,592)	5.96* (N = 5293)

Note: Eta squared = .00.
*$p < .01$.

than non-entrepreneurial faculty, at least when the operationalization of such categorical groups includes consulting and freelance activity. It may be more accurate to claim that faculty who participate in particular entrepreneurial activities—in this case, using funds for research—are slightly less committed to teaching than faculty who do not use funds for research.

Regression Findings

While the Descriptive Findings provide a basic overview of two common forms of faculty entrepreneurial activities across disciplines and teaching commitment, the findings in this section reveal the *independent* effects of entrepreneurial activities on faculty commitment to teaching.

Before addressing the main research question of this study, we present the complete regression equation in Table 5, which includes the unstandardized regression coefficient, standard error, beta, and VIF statistics. VIF statistics indicate that multicollinearity does not interfere with the regression results. Among the individual background characteristics, faculty in the *Fine Arts* (beta = .07), *Education* (beta = .06), *Humanities* (beta = .05), and *English* (beta = .05) disciplinary groupings tend to score positively on their commitment to teaching, whereas faculty in the *Social Science* (beta = −.07), *Biology* (beta = −.06), *Physical Science* (beta = −.03), and *Math* (beta = −.03) groupings tend to be negatively committed. These findings support past research that revealed disciplinary differences exist with respect to teaching (Braxton and Hargens, 1996; Lee, 2004). Findings also show that *female* faculty and *Tenured* faculty are more committed to teaching than their counterparts (beta = .02, beta = .03, respectively). One should keep in mind that these influences (i.e., *Physical Science*, *Math*, *Female*, and *Tenured*) are quite modest.

Among the institutional characteristics, *Institutional Size* and *Student-to-Faculty Ratio* were shown to have a slight negative effect on faculty *Commitment to Teaching* (beta = −.02, −.03, respectively). Correlational analyses further indicate that these large institutions tend to have large student-to-faculty ratios (r = *.58*) (see Appendix C). For the purposes of this study, we will attend to the entered entrepreneurialism measures and pay less concern to the entered control items.

In addressing the main interest of this study, findings indicate that aspects of entrepreneurialism are significantly related to faculty commitment to teaching. The amount of *Research Expenditures* are negatively associated with the dependent variable (beta = −.10). This item was the largest beta among all variables in the regression equation. Working at an institution

TABLE 5. Regression Analyses Results Predicting Faculty Commitment to Teaching at Final Step

Categories	Variables	B	Standard Error	Final Beta	VIF
Individual Background	Fine Art	.31	.03	.07***	1.09
	Education	.27	.03	.06***	1.10
	Humanities	.19	.03	.05***	1.09
	English	.26	.04	.05***	1.06
	Biology	−.23	.03	−.06***	1.11
	Social Sciences	−.24	.03	−.07***	1.13
	Physical Sciences	−.12	.03	−.03***	1.12
	Race: Asian/Asian American	−.13	.04	−.03***	1.01
	Math	−.17	.04	−.03***	1.05
	Sex: Female	.00	.02	.02**	1.08
	Tenured	.00	.02	.03**	1.06
Institutional Characteristics	Research Expenditures	.00	.00	−.10***	1.07
	Institutional Size	.00	.00	−.02*	1.60
	Student-to-Faculty Ratio	.00	.00	−.03**	1.54
Individual Entrepreneurialism	Used Funds for Research	−.21	.02	−.09***	1.10
	Consulting Activity	.00	.02	.03***	1.03

Note: $R^2 = .06$; N = 16,785.
*$p < .05$; **$p < .01$; ***$p < .001$.

with high research expenditures may actually influence in a negative manner faculty *Commitment to Teaching*.

At the individual level, entrepreneurial activity also appears to affect faculty commitment to teaching. *Using Funds for Research* is negatively related (beta = −.09) to the dependent variable. This item produced the second highest beta coefficient among all the variables in the regression equation. This finding demonstrates that individual entrepreneurial activity, specifically in the form of using funds for research, may have a negative impact on faculty teaching commitment. In contrast, *Consulting Activity* appears to have a modest positive effect (beta = .03). As shown in the descriptive analyses, not all forms on entrepreneurialism work similarly. Consulting activity does not hinder faculty teaching and may produce a stronger commitment.

LIMITATIONS

This study attempted to examine the effects of entrepreneurialism on faculty teaching. Although direct relationships appear to exist, there are some limitations to this study that must be acknowledged. First, we utilized a large database that was not intentionally created to specifically examine faculty entrepreneurialism and teaching. We had limited variables to examine this possible relationship. Our dependent variable's reliability alpha is somewhat marginal (alpha = .62). Additional related items might have better reflected Commitment to Teaching. In addition, we had access to only two entrepreneurial measures, which provides limited ways to examine entrepreneurship and thus might explain the relatively low R^2. Given these limitations, future research should consider other aspects of entrepreneurialism that affect different facets of faculty teaching, such as their teaching load and practices.

DISCUSSION

Given that faculty entrepreneurial activities are likely to increase, higher education analysts must pay greater attention to this important area of inquiry. This is especially true in light of the economic downturn at the beginning of the 21st century. In recent years over 40 states have been confronted with budget deficits: $5 billions in New Jersey (20% its budget), $5.7 billions in New York (6.5%), and as much as $17 billions in California (17%), its largest deficit since World War II (Selingo, 2002). Research universities throughout the country face challenging economic times. For example, the University of California, over a recent two-year period, faced a possible $74 millions cut, in addition to an estimated $184 millions previous reduction (Ruark, 2002). Accordingly, the University of California and other universities nationwide are increasingly seeking out entrepreneurial activities and partnerships as possible ways to offset declining revenues. Such circumstances call attention to the need to scrutinize entrepreneurial solutions.

Our study demonstrates that there are some negative relationships between various measures of entrepreneurialism and commitment to teaching. Large research institutions that generate and expend the most research dollars are especially prone to neglecting undergraduate instruction. This finding is not surprising given the prevailing criticism that large research institutions tend to compromise their instructional mission (Boyer, 1990; Kennedy, 1997).

State leaders must be aware of how major budgetary cutbacks to higher education create entrepreneurial environments that potentially threaten

faculty commitment to instruction, particularly among the major flagship institutions. Likewise, institutional leaders and policy makers should carefully weigh the consequences of entrepreneurial activities for students at such institutions.

The growing shift toward entrepreneurial models, or what Slaughter and Leslie (1997) describe as "academic capitalism," introduces a new system of rewards whereby faculty increase their and their institution's prestige based on their success in generating revenue. Faculty who engage in funded research should especially be held accountable to their teaching role. It may be the case that the negative relationship between working on funded research and commitment to teaching is actually reinforced by particular policies and practices. To what extent does the practice of releasing faculty from teaching courses for the sake of conducting research negatively affect commitment to teaching? And are there alternatives to such practices? The presumption is that faculty require a lighter teaching load when they are engaged in intense funded research projects. But, would a more flexible teaching load solve the problem as well? These are the sort of questions higher education analysts should pursue as we struggle to understand the complex relationships between entrepreneurialism and teaching.

Our study demonstrates that some forms of entrepreneurialism may also affect one's commitment to teaching in positive ways. Consultant activity, in particular, does not appear to hinder directly faculty teaching. This might be explained by the fact that consulting tends to occur outside the walls of one's institution and is most often an example of the application of one's knowledge to real-world problems. Such hands-on experiences may provide great insight when it comes to instruction. It is important to mention that although we found consulting to be positively (and slightly) related to a commitment to teaching, consulting may also have its limitations, including the lack of support for graduate students, especially in the form of graduate assistantships that often are generated by research grants. This suggests a need to further differentiate revenue-generating activity as well as examine in-depth the ways that consulting relates to teaching.

An interesting finding of our study concerns consulting and disciplinary differences. We expected to see little revenue-generating activity among faculty in the Pure-Non-life fields (i.e., Humanities and Fine Arts). By including "freelance work" as a form of revenue-generating activity, we found these faculty more involved than we anticipated. In other words, we find that faculty in the Fine Arts and Humanities do engage in entrepreneurial activity, but not necessarily in the same ways as Engineering faculty do. This finding shows that entrepreneurialism is an

institution-wide issue even though specific forms of entrepreneurialism may differ widely across disciplinary fields. Whereas most research has focused on faculty entrepreneurs within the hard and applied sciences, this study demonstrates the need for more extensive research on faculty entrepreneurialism in non-applied science disciplines.

APPENDIX A. Variables and Coding Scheme

Variables	Coding Scheme
Commitment to Teaching (Factor)	
Importance of Being a Good Teacher	5 point scale: 1 = not important to 3 = very important
Reason for Career: Opportunity for Teaching	4 point scale: 1 = not important to 4 = essential
Individual Background	
Gender	1 = male; 2 = female
White/Caucasian	1 = not marked; 2 = marked
African American/Black	1 = not marked; 2 = marked
American Indian	1 = not marked; 2 = marked
Asian American/Asian	1 = not marked; 2 = marked
Mexican American/Chicano	1 = not marked; 2 = marked
Tenure Status	1 = no; 2 = yes
Biology	1 = not marked; 2 = marked
Business	1 = not marked; 2 = marked
Education	1 = not marked; 2 = marked
Engineering	1 = not marked; 2 = marked
English	1 = not marked; 2 = marked
Health Science	1 = not marked; 2 = marked
History/Political Science	1 = not marked; 2 = marked
Humanities	1 = not marked; 2 = marked
Fine Arts	1 = not marked; 2 = marked
Mathematics	1 = not marked; 2 = marked
Physical Sciences	1 = not marked; 2 = marked
Social Sciences	1 = not marked; 2 = marked
Institutional Characteristics	
Institutional Size	Continuous (Total Student Enrollment)
Urban Setting	5 point scale: 6 = large city (> 250,000) to 1 = rural
Institutional Research Expenditures	Continuous ($ per FTE student)
Institutional Instructional Expenditures	Continuous ($ per FTE student)
Selectivity	Continuous (SAT Math + SAT Verbal)

APPENDIX A. (*Continued*)

Variables	Coding Scheme
Student-to-Faculty Ratio	Continuous
Tuition Revenues	Continuous ($ per FTE student)
Individual Entrepreneurialism	
Used Intra- or Extramural Funds for Research	1 = no; 2 = yes
Consulting Activity	1 = no; 2 = yes

APPENDIX B. Means and Standard Deviations of All Variables

Variable	Mean	Standard Deviation
1. Commitment to Teaching (Factor)	5.96	1.06
2. Gender	1.32	0.47
3. White/Caucasian	1.89	.31
4. African American/Black	1.02	.15
5. American Indian	1.01	.10
6. Asian American/Asian	1.05	.21
7. Mexican American/Chicano	1.01	.00
8. Tenure Status	1.68	.47
9. Biology	1.07	.26
10. Business	1.05	.22
11. Education	1.06	.25
12. Engineering	1.07	.25
13. English	1.03	.19
14. Health Science	1.09	.29
15. History/Political Science	1.05	.21
16. Humanities	1.07	.26
17. Fine Arts	1.06	.24
18. Mathematics	1.03	.18
19. Physical Sciences	1.08	.27
20. Social Sciences	1.11	.32
21. Institutional Size	22,546.45	12,129.74
22. Urban Setting	5.70	1.36
23. Institutional Research Expenditures	3345.94	2704.05
24. Institutional Expenditures	6824.79	3495.46
25. Selectivity	1163.15	105.71
26. Student-to-Faculty Ratio	23.64	3.96
27. Tuition Revenues	6151.27	4416.92
28. Used Intra/Extramural Funds for Research	1.69	.46
29. Consulting Activity	1.21	.52

APPENDIX C. Intercorrelations Among All Variables (See Appendix B for Variable Names)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1		.04	.02	.02	.01	−.04	.01	.01	−.08	−.01	.09	.00	.06	.00	.00	.06	.09	−.03	−.05	−.08	−.06	−.05	−.13	−.04	−.07	−.04	−.01	.01	−.14
2			.00	.06	.02	−.03	.01	−.18	−.05	−.05	.10	−.13	.06	.10	−.01	.03	.02	−.07	−.12	.05	−.02	.00	−.04	−.01	−.07	.02	.01	−.05	−.04
3				−.40	−.05	−.61	−.18	.08	.03	.00	.01	−.06	.02	.02	.01	−.01	.01	−.03	.01	−.01	−.01	−.02	−.02	.00	.01	−.03	.00	.04	−.01
4					.07	−.02	.01	−.06	−.03	−.01	.03	−.02	.01	.00	.02	−.01	.02	−.02	−.03	.03	.01	.02	.00	.01	.00	.01	.01	.00	−.03
5						.00	.04	−.01	−.01	−.01	.01	−.02	.00	−.02	.01	.01	.02	−.01	−.02	.01	−.01	−.01	−.02	−.02	−.02	.01	−.02	.01	−.02
6							.00	−.06	.00	.02	−.04	.11	−.01	.00	−.04	−.02	−.02	.06	.02	−.03	.01	.01	.02	−.01	.00	.02	.00	−.03	.03
7								−.03	−.01	.00	.02	−.01	.00	−.01	.00	.01	.01	.00	−.02	.01	.01	.01	.02	.00	−.01	.02	−.02	−.01	−.01
8									.04	−.01	−.05	.04	.02	−.12	.01	.01	.00	.04	.06	−.01	.08	.01	.06	.01	.08	.03	−.01	.05	.03
9										−.07	−.08	−.08	−.06	−.09	−.07	−.08	−.08	−.05	−.08	−.10	.02	−.01	.04	.02	.00	−.01	−.02	−.02	.14
10											−.07	−.07	−.05	−.08	−.06	−.07	−.07	−.05	−.07	−.09	−.05	−.01	−.03	.00	.03	−.01	.05	.03	−.08
11												−.07	−.06	−.09	−.06	−.08	−.07	−.05	−.08	−.10	.01	−.03	−.10	−.07	−.09	.03	−.07	.04	−.06
12													−.06	−.09	−.06	−.08	−.07	−.05	−.08	−.10	−.02	−.05	.13	.01	.13	−.05	.01	.08	.09
13														−.06	−.05	−.06	−.06	−.04	−.06	−.07	−.02	.00	−.03	−.01	−.01	.00	.01	−.02	−.05
14															−.07	−.09	−.09	−.06	−.09	−.12	.11	.09	.01	.00	−.17	.06	−.09	.02	.02
15																−.07	−.06	−.05	−.07	−.09	−.04	.02	.00	.05	.05	−.02	.07	−.03	.00
16																	−.08	−.05	−.08	−.10	−.03	.04	.00	.06	.09	−.03	.10	−.05	−.07
17																		−.05	−.08	−.10	.00	.02	−.01	−.01	.00	.03	−.01	.02	−.10
18																			−.06	−.07	−.01	−.01	.00	.00	.01	.01	.01	−.02	−.05
19																				−.11	−.03	.00	.03	.02	.05	−.01	.00	−.02	.11
20																					−.02	.02	−.01	.02	.01	.03	.04	.01	.05
21																						.38	.16	−.12	−.08	.58	−.44	.02	.11
22																							.17	.22	.15	.37	.11	.03	.04
23																								.53	.53	.05	.16	.04	.17
24																									.46	−.21	.48	.01	.06
26																										−.13	.45	.02	.04
27																											−.37	.02	.04
28																												.01	−.03
29																													.07

As research universities increasingly turn to entrepreneurial activities as a means to support institutional operations, researchers need to analyze such shifts and offer empirically based insights. If supporters of research universities, including faculty, administrators, and policy makers, are to value education in general and undergraduate education in particular, then clearly they must understand the complex and varied effects of entrepreneurialism.

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Received March 27, 2003.