Faculty Time Allocations to Teaching, Research and Other Work

Sam Allgood

and

William Walstad

December 22, 2006

Preliminary draft: not to be used for citation or quotation without authors' permission

*Paper prepared for presentation at the American Economic Association annual meeting, Chicago Illinois (January 5, 2007). The authors are, respectively, Associate Professor of Economics and Professor of Economics, Department of Economics, University of Nebraska-Lincoln, Lincoln, NE 68588-0489. Authors' contact information: sallgood1@unl.edu and wwalstad1@unl.edu.

I. Introduction

Faculty members who have responsibilities for teaching, research, and other activities have a substantial amount of discretion over how they spend their time on each task. Although they are typically assigned to teach a certain number of courses per semester, they can decide to allocate more or less time to that task outside the classroom. Although they may have research responsibilities, they can decide how much time to devote to research projects and publications given their teaching and other work constraints. As for other activities, they have some degree of control over this work time by deciding on which committees to serve or how much consulting they wish to do. The result of all this discretion is that there is a perpetual debate about the optimal or appropriate way for faculty to allocate their work time. Gautier and Wauthy (forthcoming) argue that how faculty divide their time between teaching and research is "largely a matter of taste and incentives" and find that few studies have been undertaken that examine the allocation of time to research, teaching, and the other tasks academics must do.[1] This study seeks to fill part of that void.

One presumption often made about the teaching and research work of faculty members is that the time spent on one activity substitutes for time spent on the other activity. That is, if a faculty member spends more time on research it will come at the expense of time spent on teaching, or vice versa. Such a conclusion is not necessarily true. Faculty members can choose to work more or less, so that an additional hour of teaching may mean an hour less of leisure rather than an hour less on research. Einarson and Clarkberg (2004) found that the amount of time spent with students out of class is not affected by faculty time constraints. They found that faculty members with children and beliefs about the role of faculty members are what determined the amount of time devoted to these interactions. Milem, Berger and Dey (2000)

[1] A previous study by Becker (1979) offers a theoretical model of such decisions under different reward structures.

found that faculty members can devote more time to *both* teaching and research. It may also be the case that if there is a substitution between teaching and research, it is only uni-directional. It may be, for example, that more time spent on teaching may lead to less time spent on research, but less time spent on research does not necessarily mean more time spent on teaching.

This study uses a national survey of faculty members to investigate how faculty members allocate their time to teaching, research, and other activities. The rich data set permits estimates to be made about the degree to which faculty members substitute time across their primary work responsibilities. A system of three equations is estimated with the dependent variables being time spent teaching, time spent on research, and time spent in all other activities. By simultaneously estimating these equations, two related, but different, questions can be addressed. First, do faculty members who spend more time doing one task, such as research, spend less time doing another task, such as teaching? Second, do heavier work loads for one task, such as teaching, mean that faculty members spend less time on other tasks, such as research?

II. Data and Restrictions

The data source is the National Survey of Postsecondary Faculty (NSOPF) conducted by the National Center for Education Statistics (NCES) in 1998–1999. NCES sent surveys to over 26,000 faculty members at more than 960 postsecondary educational institutions of all types, including two-year schools but excluding private for-profit institutions. A total of about 18,000 faculty members responded to the survey because of the various methods used by the NCES to ensure faculty participation. The weighted response rate was 83 percent.[2]

Several restrictions were imposed to create the final data set used for the study to standardize the type of faculty member under investigation. The sample was limited to those

[2] The surveys and all supporting documents for the NSOPF are available at the web address http://nces.ed.gov/surveys/nsopf/.

faculty members who were employed full-time at research universities, held a rank of assistant, associate, or full professor, and taught at least one undergraduate or graduate class. The institutional type restriction eliminated all faculty members at institutions such as community colleges or four-year colleges and universities where research was not a primary responsibility for faculty members.

The full-time restriction meant that a faculty member at a research institution must be on at least a nine-month contract, and can not be paid by credit hour or the number of courses taught. This restriction eliminated many faculty members such as adjunct instructors and part-time instructors from the full sample. Although these faculty members play an important role at research institutions, they make different decisions about labor supply than do full-time faculty members with teaching, research, and other responsibilities.

The rank and teaching restrictions meant that the sample was composed of professors whose primary responsibilities were a combination of teaching, research, and other activities such as service or consulting. Faculty members were deleted if their job title indicated that they were more of an administrator, such as dean or coordinator, rather than a regular professor with teaching and research duties. Faculty members were also deleted from the full sample if they were employed in the medical, legal, or vocational professions because their responsibilities and contracts can be different from most other faculty members.

The other restrictions involved problems with the data. All observations with missing values were deleted. All observations with a sample weight of zero were eliminated. Starting from a sample of over 18,000 observations, the final sample used for the study was composed of 2,307 faculty members working at 199 research universities.[3]

[3] We also eliminated the few (16) faculty members whose race was not white, black, or Asian.

III. Statistical Model and Variable Definitions

A three-equation model was specified for the study to explain how faculty members spend their work hours in teaching, research, or other work activities.

$$h_i^t = \beta_0^t + \beta_1^t X \ + \beta_2^t z_1^t + \beta_3^t h_i^r + \beta_4^t h_i^o + \varepsilon_i^t$$

$$h_i^r = \beta_0^r + \beta_1^r X \ + \beta_2^t z_1^r + \beta_3^t h_i^t + \beta_4^t h_i^o + \varepsilon_i^r$$

$$h_i^o = \beta_0^o + \beta_1^o X \ + \beta_2^o z_1^o + \beta_3^o h_i^r + \beta_4^o h_i^t + \varepsilon_i^o$$

In the system, h^t is hours per week spent teaching, h^r is hours per week spent on research, and h^o is hours per week time on other work. Each of the hour variables is influenced by a common set of exogenous explanatory variables (X). Each of the hour variables is also influenced by a set of exogenous variables (z's) unique to each hour variable. These *z's* may be a scalar or a vector.

The three-equation model was estimated with two-stage least squares (2SLS) to correct for a simultaneous-equation bias with OLS estimators. Hours for research and hours for other activities are endogeneous regressors in the teaching equation. Hours for teaching and hours for other activities are endogeneous regressors in the research equation. Hours for teaching and hours for research are endogeneous regressors in the other work equation. When a simultaneous relationship exists, there is a correlation between an endogenous regresssor and the error term for the equation that produces biased and inconsistent parameter estimates. 2SLS corrects this problem by replacing the endogeneous regressors with an instrumental variable estimated from all the exogeneous variables in the model. The NSOPF data set provides survey weights to account for over- and under-representation of groups. The 2SLS estimation makes use of these weights and the reported standard errors are robust.[4]

[4] All statistics are computed using survey commands in Stata. Two-stage least squares estimation was performated equation-by-equation using svyivreg.

The means and standard deviations for all the variables used in estimating the three-equation model are shown in Table 1. An explanation is necessary, however, for how these dependent variables and the regressors were measured and used for the analysis. To simplify the explanation, the variables listed in Table 1 are grouped into several categories.

Time variables (dependent variables). The time devoted to the three tasks (teaching, research, and other) was constructed from variables in the NSOPF data set. First a variable was constructed for the total number of hours a professor worked per week on job-related matters, including time spent working outside the university (TotalTime**)**. Faculty members were asked what fraction of time they devoted to different tasks, such as teaching (undergraduate and graduate), research, and other work. These percentages were used to construct variables for how much time was devoted to each task. TeachTime is the time devoted to graduate and undergraduate education. ResearchTime is computed from a question asking about time spent on research. OtherTime is the sum of time spent on other work-related activities such as administration, service, professional growth, and time spent working on consulting projects.[5]

Faculty members reported working 56 hours a week on average. Almost half of this time was spent on teaching (28.3 hours), and of this teaching time 16 hours per week was devoted to undergraduate teaching and 12 hours were spent on graduate teaching. The remaining time was split about equally between conducting research (14.4 hours) and doing other activities (13.3 hours). The time spent on other activities can be divided into four tasks: administrative duties (6.2 hours); service (3.7 hours); professional growth activities (1.7 hours); and working outside the university on consulting projects (1.6 hours).

[5] This study used the actual time allocated to the three tasks as the dependent variables. An alternative approach would be to use the percentage of time for each task as the dependent variables. This approach, however, has the limitation of requiring substitution. The percentages of time for all tasks must sum to one, so spending a larger fraction of time on research means that a smaller fraction of time must be spent on teaching, and other, or both. The use of time does not impose this substitution on the model or estimation.

Teaching. Four exogenous variables were included in the analysis to capture different facets of faculty teaching load. The first variable is the number of undergraduate students taught that semester. The second and third variables are, respectively, the number of undergraduate classes and the number of graduate classes taught.[6] Included as a fourth variable is the percentage of students a faculty member reported communicating with via e-mail. The data show that the average teaching load is 2.3 classes, with more undergraduate classes taught (1.3) than graduate classes (.97). Faculty members teach about 58 students on average in the courses they teach. Faculty members report that they have e-mail contact with about 31 percent of their students on average.

The variables associated with teaching load are expected to be positively and significantly related to time spent teaching. The course load variables are predetermined at the time that a faculty member makes a time allocation decision. A faculty members e-mail students mainly *in response* to the students' e-mails, and these total e-mails provide an indicator of the amount of time spent by faculty members in communicating with students.

The four teaching variables are included only in the teaching equation in the system of simultaneous equations. The specification states that the four teaching variables have direct effects on teaching time, which in turn has a direct effect on research time and other time. Once faculty members receive their teaching assignments for the semester, they allocate their time to teaching. A larger teaching load would increase teaching time, and this increase would reduce time spent on research or other work. Such a specification does not eliminate the effect of the four teaching variables on research time or other time, but it states that these variables have only an indirect effect on research time through their direct effect on teaching time or other time.

[6] Question 41 of the survey asks detailed questions of up to five classes taught by the professor. Variables on teaching load are constructed from this survey item.

Research. Three exogenous variables were included in the model to explain the time spent on research. The total amount of grant dollars is a workload indicator because it suggests that a faculty member is responsible for overseeing and using grant resources. Faculty members reported receiving $109,000 on average in grant funding. Such funding is most likely research related and used to support research projects, and thus most likely to increase the amount of time spent on research. Also included only in the research time equation were the self-reported number of articles published in the last five years (RecentArticles) and the number of articles published over one's career (CareerArticles). These are two predetermined variables that reflect a professor's inclination to conduct research. This group of faculty members was very productive because they reported that 7.2 articles were published on average in the last five years (the median is 4 publications) and they had an average of 32 career publications.

The specification for research time in the simultaneous equation states that the three research variables have direct effects on research time, which in turn has a direct effect on teaching time and other time. More grant funding and more recent and career publications would be strong indicators of a faculty member's interest in and propensity to spend time doing research. Such an orientation or expectation for research work would increase time spent on research and thus reduce time spent on teaching or other tasks. The three research variables only have direct effects on research time in the set of simultaneous equations, but they can have indirect effects on teaching time or other time through this direct effect on research time.

Other Work. Faculty members have other responsibilities that affect workload. One such variable is the number of committees on which a faculty member serves (3.6 on average). That responsibility becomes even greater when a person serves as the chair of a committee. The faculty members chaired, on average, about one of the 3.6 committees on which they served.

Another variable affecting the use of time other than for teaching or research is whether or not a faculty member does consulting work outside a university (37.5 percent do). These three variables are likely to be positively and directly related to the amount of time a faculty member spends on other activities. Time spent participating in committees or doing consulting work is time that is not being used for research or teaching. The specification permits the other variables to influence teaching and research time, but only indirectly through their effect on other time.

The next three types of explanatory variables control for other characteristics of faculty members such as job status, demographic features, and fields of study or academic disciplines. These exogeneous variables are common to each equation and are not unique as are the exogenous variables for teaching, research, or other work previously described. For these variables there are no a priori hypotheses about whether they are likely to have a significant or predictable influence on a dependent variable. They are included in each of the simultaneous equations to control the basic characteristics that are often used to describe professors.

Job Status Variables. Several dummy variables were specified and included in the model to capture the effects of job status factors. The first factor is for professorial rank. In this study about 40 percent of professors are full professors, 32 percent are associate professors, and 28 percent are assistant professors. Dummy variables are included for full professors and associate professors and the omitted variable is for assistant professors. The second factor is for the tenure status of the faculty member (66 percent are tenured; no is the omitted variable). The third factor is the union status of the faculty member (12 percent are members of a union; no is the omitted variable). For all these variables, there was no a priori hypothesis about their effects on time allocation to any of the three job duties.

Demographics. The study included some demographic variables that are commonly used in models of labor supply. The sample is predominantly male (77 percent), white (89 percent), and married (77 percent). Gender is included as a dummy variable (1=male) and so is marital status (1=married). Race is captured with two dummy variables with one to control for black or African-American professors (1=black) and one to control for Asian professors (1=Asian), with the omitted term for white professors. Also included in the demographics was a continuous variable for age in years. The average age was about 49 years old.

Field of Study. The final set of common and exogenous variables captured differences in the fields of study or disciplines of the professors. What follows are the 11 dummy variables for fields or disciplines with the related percentage of faculty members in that field or discipline shown in parentheses: business or economics (8.0); biological sciences (9.2); physical sciences (8.1); education(5.4); fine arts (6.1); health sciences (13.3); engineering (9.9); mathematics and computer science (8.5); humanities such as history, philosophy or religion (11.3); occupation specific (4.6); and other fields (5.0). The omitted term was for professors in the social sciences (11) [excluding economics].

IV. Estimates

A series of tests was conducted to determine if the three time variables are endogenous to each other (Hausman, 1978). The results are not reported here, but in each case the Hausman statistic had a p-value of less than 0.01, which supports the initial expectation that the variables are endogenous. Therefore, 2SLS should be used for the estimation of the three-equation model.

The first three columns of data in Table 2 present the OLS results from the reduced form estimation of each equation. These equations show the total effect (direct and/or indirect) from each exogeneous variable on each dependent variable. The reduced form results indicate that

these exogenous variables can be used to create a valid instrument for the second stage of estimation. Of most interest in this respect are the effects of the exogeneous variables that are unique to a simultaneous equation and which over-identify the model for estimation purposes.

Each of the unique exogenous variables typically has the expected sign and is statistically significant in explaining its respective dependent variable.[7] This conclusion holds for the TeachTime equation and three of its four teaching variables (undergraduates, undergraduate classes, graduate classes). It also holds for the ResearchTime equation and all three of its research-related variables (total grants, recent articles, and career articles) and for the OtherTime equation and two of its three variables associated with other work (committees, consulting). By contrast, these variables are not statistically significant in explaining an unrelated dependent variable in almost all cases.[8] For example, none of the teaching variables used to explain TeachTime are statistically significant in either the ResearchTime or OtherTimes equations.

The last three columns of Table 2 presents the 2SLS estimates that show the effects of the endogeneous explanatory variables. The results suggest that there is a trade-off between time spent on teaching and research. A faculty member who chooses to spend another hour on research, *ceteris paribus*, would spend 18 minutes less on teaching. Each additional hour spent on teaching means that the professor spends 26 minutes or less on research. The magnitude of the trade-offs can better be understood using a 10-hour change, which might be more realistic of what might occur over a week. A professor who spends 10 hours more per week on research would spend 3 hours less per week on teaching, and a professor who spends 10 hours more per week on teaching would spend 4.3 hours less per week on research.

[7] For this study, statistical significance is at the .10 level or less (two-tailed test).
[8] The possible exception would be for two of the three research variables (RecentArticles and CareerArticles) that are statistically significant in the OtherTime equation, but the opposite signs suggest the effects are mixed.

The trade-offs can also be understood from an elasticity perspective. The elasticity of TeachTime to ResearchTime per week is estimated to be –.15 based on this calculation: [(–3/28.253) / (10/14.388)]. The elasticity of ResearchTime to TeachTime per week is estimated to be –.85 based on this calculation: [(–4.3/14.388) / (10/28.253)]. The elasticities incorporate the fact that TeachTime is almost twice as large in mean hours as ResearchTime, which affects the percentage change. A decline of 4.3 hours per week in research due to a 10-hour increase in teaching time per week represents a greater percentage change in research time than the percentage change in teaching time represented in a decline of 3 hours in teaching per week due to a 10-hour increase in research per week.

The 2SLS results show no other simultaneous relationship among the endogenous variables. OtherTime does not significantly influence Research Time and ResearchTime does not significantly influence OtherTime. OtherTime has no significant effect on TeachTime. Although TeachTime negatively and significantly affects OtherTime, this result indicates that there is only a uni-directional relationship between the two variables. In this case, 10 more hours spent on teaching per week would reduce time spent on other work per week by 2.6 hours. The elasticity would be –.55 based on this calculation: [(–2.58/13.271) / ((10/28.253)].

Teaching, Research, and Other. The unique set of exogenous variables in each simultaneous equation generally had the expected direct and significant effects. For the TeachTime equation, an increase in the number of undergraduate students who are taught by a professor increases the time devoted to teaching. Teaching an additional undergraduate or graduate class increases teaching time by about 2 hours a week. In addition, professors who e-mail with more students spend significantly more time teaching although the size of this effect on teaching time is relatively small compared with the other teaching variables.

As for the research equation, the number of articles published made a positive and significant difference. The number of articles can be ones recently published or they can be the total number of articles published over a career. It would be expected that someone with many recently published articles would report spending more hours on research work. In the case of career articles, this effect is more difficult to interpret because recent publications are already controlled. This effect may reflect a career commitment in research, and thus on-going interest in spending time on research regardless of the number of recent publications. As was expected, the total amount of grant funding affects time spent on research because most of such grant funding would be for projects involving research.

In the other equation, professors on more committees do spend significantly more time on tasks other than research and teaching. Chairing a committee also increases time spent on other tasks. It does not, however, have a statistically significant effect on other time perhaps because the chairing duties are much more burdensome than serving on a committee or because professors who chair committees are efficient with the use of their time. As expected, professors who consult more spend significantly more time on other activities.

Job Status. A full professor spends about 3 hours less on teaching per week and over 4 hours more on other tasks when compared to an assistant professor. Associate professors spend about 2 hours less on teaching and about 3 hours more on other tasks relative to assistant professors. The teaching results may reflect that the human capital developed by full or associate professors permits them to spend less time on teaching because they have more experience in teaching their courses and know how to make efficient use of their time. Assistant professors may spend more time on teaching because they might be teaching new courses or want to develop a good teaching record for tenure and promotion.

The reasons that full and associate professor spend more time on other tasks may be due to a several factors. Full and associate professors often serve on more committee and this requires more of their other time. Assistant professors are sometimes told to minimize their committee service so they can spend the time on research work that will be used to judge whether they should be granted tenure. Full and associate professors may do more consulting because they have more established reputations than assistant professors.

The other two job status variables are tenure and union membership. The negative and significant effect of tenure on other tasks may also be capturing a consulting influence that is similar to that found for full or associate professors. Untenured faculty members probably spend less time on other tasks because they are not in a position to do much consulting work. There is no significant effect of union membership on any of the dependent variables.

Demographics. The 2SLS results show that demographics matter. Men spend 1.4 hours more per week on research than do women. Men also appear to spend less time on teaching and other work, but the effects are not statistically significant. As for race, Asian professors devote significantly less time to teaching than do white professors, but there are no other significant differences between the two groups in time spent on research or other work. Black professors spend significantly less time on research than do white professors, but not on the other two outcome variables. Married professors spend 1.6 hours less per week on research, but there are no significant differences between married and unmarried faculty members on research or other work. Also, age has a significant and adverse effect on research time but not on teaching time or other time. As might be expected, younger professors are more likely to spend time on research than older professors, on average, perhaps because their research training is more current and they have a greater interest in developing a research agenda and reputation.

Field of Study. There are variations across the equations in terms of which fields of study or disciplines are statistically significant. The omitted variable is faculty members in the social sciences (excluding economists). Relative to this group, faculty members in the physical sciences spent more time (3.3 hours per week) on teaching and so do faculty members in engineering (4.5). Why this outcome occurs is difficult to explain. Perhaps it is because these professors in the physical sciences and engineering spend more time with students working on projects or lab activities or they provide more individual instruction.

Significantly less time per week is spent on research by professors in fine arts (3.3), education (2.4), humanities (2.7), health sciences (2.7), and other fields (2.8) relative to professors in the social sciences. These results suggest that those faculty members in less technical, quantitative, or scientific fields or disciplines are spending less time on research. The exception is perhaps health sciences, but it is not surprising. Professors involved in fields related to the health sciences may be somewhat less focused on research because they are less concerned with publications and are more focused on occupational or professional activities.

Greater time is spent on other tasks by professors in the health sciences (5.3), fine arts (2.7), occupation-specific fields (2.2), and other fields (3.7). As noted in the model explanation, time spent on other tasks is largely a function of committee work or consulting. It is doubtful that professors in the above fields have more of an affinity for committee work than other professors. What is more likely is that professors in these applied or professional fields have more consulting opportunities for their time or their interests may be outside the more limited realm of the university. This consulting explanation would apply to the health sciences, and to occupation fields that includes architecture or environmental design, parks and recreation, and protective services. The broader interest explanation would apply to the fine arts.

V. Conclusion

The results from this study of a national sample of university faculty members show that time spent on teaching and time spent on research are substitutes for each other. The degree of substitution, however, is asymmetric. The negative effect of teaching time on research time is greater than the negative effect of research time on teaching time. The elasticity of teaching time with respect to research time is only –0.15, which suggests that as professors spend more time on research they are not likely to reduce their time spent teaching by a significant amount. The elasticity of research time with respect to teaching time is –0.85. In this case, professors who can reduce their teaching time by one hour are likely to spend almost an additional hour doing research. Time spent on other tasks does not affect either teaching time or research time.

There are implications for the study related to concerns about increasing research demands or increasing teaching demands at universities. The results show that increasing research requirements is not likely to have much of an adverse effect on the time spent on teaching by faculty members. Encouraging professors to spend more time on research should not lead to a shirking of teaching duties perhaps because most professors well understand the responsibilities involved meeting their teaching obligations and are not likely to spend much less time on instruction. A more difficult problem involves getting professors to spend more time on teaching. Here the trade-off in time cost is greater, and almost one-to-one in percentage terms. This result may explain why professors are more reluctant to adopt new teaching innovations that require more instructional time to implement. It also suggests, however, that professors are likely to be more willing to adopt instructional innovations which reduce teaching time or make professors more efficient in teaching, such as technologies to manage classroom records and communications and ones that help prepare or grade homework and tests.

References

Becker, William E. 1979. "Professorial behavior given a stochastic reward structure," *American Economic Review*, 69, 1010-1017.

Gautier, Axel, and Wauthy, Xavier. forthcoming. "Teaching versus research: A multi-tasking approach to multi-department universities," *European Economic Review*.

Einarson, Marne K., and Clarkberg, Marin E. 2004. Understanding faculty out-of-class interaction with undergraduate students at a research university. Working paper, Office of Institutional Research and Planning, Cornell University.

Hausman, J.A. 1978. "Specification tests in econometrics," *Econometrica*, 46, 1251-1271.

Milem, Jeffrey F., Berger, Joseph B., and Dey, Eric L. 2000. "Faculty time allocation: A study of change over twenty years," *The Journal of Higher Education*, 71(4), 454-475.

Table 1: Descriptive Statistics

Variable	Mean	S.D.
Time Variables **(in hours)**		
TotalTime	55.912	0.391
TeachTime	28.253	0.339
Undergraduate Time	16.172	0.390
GraduateTime	12.082	0.325
ResearchTime	14.388	0.315
OtherTime	13.271	0.304
AdministrativeTime	6.216	0.185
ServiceTime	3.724	0.180
OutsideTime	1.617	0.100
GrowthTime	1.715	0.094
Teaching		
UndergraduateStudents	57.661	2.383
UndergraduateClasses	1.375	0.035
GraduateClasses	0.977	0.030
StudentEmail	31.278	0.965
Research		
TotalGrant ($1,000)	109.153	6.783
RecentArticles	7.221	0.275
CareerArticles	32.130	1.111
OtherWork		
Committees	3.597	0.097
CommitteesChaired	0.868	0.048
Consulting	0.376	0.014
Job Status		
FullProfessor	0.398	0.014
AssociateProfessor	0.324	0.014
AssistantProfessor	0.278	0.012
Tenured	0.661	0.013
UnionMember	0.117	0.009
Demographics		
Male	0.767	0.011
White	0.885	0.008
Asian	0.084	0.007
Black	0.034	0.004
Married	0.768	0.012
Age (years)	48.915	0.299
Fields of Study		
Business&Econ	0.081	0.007
Biological	0.092	0.008
Physical	0.081	0.008
Education	0.054	0.006
FineArts	0.061	0.006
Health	0.133	0.012
Engineering	0.099	0.008
ComputerMath	0.085	0.008
Humanities	0.113	0.008
Otherfield	0.050	0.006
OccupationSpecific	0.046	0.006
SocialScience	0.106	0.008
N	2,307	

Table 2: Equation Estimation

	Reduced Form Eq. (OLS) Dependent variables			Simultaneous Eq. (2SLS) Dependent variables		
Regressors	**Teach Time**	**Research Time**	**Other Time**	**Teach Time**	**Research Time**	**Other Time**
UndergraduateStudents	0.023	0.000	–0.005	0.023		
	(2.90)	(0.01)	(1.34)	(3.28)		
UndergraduateClasses	2.504	–1.555	–0.605	1.966		
	(6.69)	(5.86)	(2.00)	(5.15)		
GraduateClasses	1.974	–0.539	0.351	1.842		
	(5.96)	(1.79)	(1.14)	(5.77)		
StudentEmail	0.014	0.011	0.002	0.017		
	(1.56)	(1.59)	(0.26)	(1.99)		
TotalGrant	–0.003	0.007	0.001		0.005	
	(2.83)	(5.24)	(0.48)		(4.16)	
RecentArticles	–0.016	0.087	0.057		0.091	
	(0.51)	(2.73)	(1.68)		(2.98)	
CareerArticles	–0.008	0.057	–0.024		0.053	
	(0.78)	(5.92)	(2.52)		(6.32)	
Committees	0.161	–0.174	0.692			0.733
	(1.11)	(1.64)	(4.80)			(5.16)
CommitteesChaired	–0.184	–0.241	0.518			0.535
	(0.50)	(0.96)	(1.21)			(1.35)
Consulting	–0.989	0.013	3.942			3.940
	(1.54)	(0.02)	(5.92)			(6.22)
FullProfessor	–3.339	–0.435	5.555	–2.971	–1.123	4.269
	(2.25)	(0.32)	(3.73)	(1.96)	(0.83)	(2.91)
AssociateProfessor	–2.371	–0.214	3.883	–2.186	–0.842	3.236
	(1.65)	(0.16)	(2.65)	(1.54)	(0.66)	(2.20)
Tenured	1.059	–0.341	–4.003	0.791	–0.447	–3.823
	(0.76)	(0.27)	(2.86)	(0.57)	(0.38)	(2.72)
UnionMember	0.135	–0.171	0.351	0.055	–0.207	0.320
	(0.14)	(0.22)	(0.44)	(0.06)	(0.31)	(0.41)
Male	–1.505	2.112	–0.608	–0.942	1.392	–1.020
	(1.96)	(3.41)	(0.86)	(1.24)	(2.19)	(1.43)
Asian	–2.531	1.773	0.065	–1.916	0.582	0.529
	(2.40)	(1.98)	(0.06)	(1.92)	(0.70)	(0.51)
Black	0.398	–1.894	1.030	–0.049	–1.734	0.999
	(0.29)	(2.25)	(0.97)	(0.04)	(1.79)	(0.87)
Married	–0.281	–1.460	0.572	–0.637	–1.604	0.405
	(0.37)	(2.46)	(1.00)	(0.86)	(2.61)	(0.72)
Age	0.107	–0.226	0.028	0.041	–0.189	0.032
	(2.28)	(6.53)	(0.62)	(0.86)	(5.44)	(0.66)
Business&Econ	0.286	–0.057	0.374	0.207	0.283	0.671
	(0.22)	(0.06)	(0.37)	(0.16)	(0.26)	(0.64)
Biological	0.017	3.827	0.018	1.271	3.877	0.523
	(0.01)	(2.86)	(0.01)	(0.85)	(3.32)	(0.35)
Physical	3.483	–0.965	–0.145	3.273	0.653	0.262
	(2.12)	(0.83)	(0.13)	(2.12)	(0.56)	(0.23)

Table 2: Equation Estimation (continued)

	Reduced Form Eq. (OLS) Dependent variables			Simultaneous Eq. (2SLS) Dependent variables		
Regressors	**Teach Time**	**Research Time**	**Other Time**	**Teach Time**	**Research Time**	**Other Time**
Education	3.226	–4.098	0.695	1.973	–2.357	1.991
	(1.94)	(3.43)	(0.47)	(1.21)	(1.90)	(1.41)
FineArts	2.740	–3.974	2.319	1.664	–3.342	2.711
	(1.79)	(3.75)	(1.89)	(1.05)	(2.83)	(2.03)
Health	–1.471	–2.515	5.255	–1.658	–2.666	5.332
	(0.94)	(2.05)	(3.65)	(1.07)	(2.08)	(3.81)
Engineering	5.305	–2.598	–0.489	4.417	–0.557	0.723
	3.77	(2.31)	(0.47)	(3.23)	(0.51)	(0.64)
ComputerMath	1.001	–0.510	–0.684	0.780	–0.126	–0.323
	(0.75)	(0.39)	(0.68)	(0.64)	(0.11)	(0.31)
Humanities	1.566	–3.050	1.058	0.855	–2.664	1.107
	(1.13)	(3.09)	(1.12)	(0.58)	(2.30)	(1.03)
OccupationSpecific	1.763	–1.231	2.296	1.582	–0.678	2.165
	(0.95)	(0.91)	(1.84)	(0.89)	(0.46)	(1.90)
Otherfield	1.744	–3.952	2.887	0.714	–2.827	3.723
	(1.18)	(3.25)	(2.14)	(0.48)	(2.20)	(2.58)
ResearchTime				–0.300		–0.071
				(3.68)		(0.68)
OtherTime				–0.096	–0.087	
				(1.01)	(1.17)	
TeachTime					–0.430	–0.258
					(6.25)	(2.80)
Constant	18.119	26.743	6.472	27.092	36.008	14.117
R-squared	0.157	0.273	0.168	0.271	0.347	0.244
F	8.616	21.443	7.519	11.363	28.987	8.587
N	2307	2307	2307	2307	2307	2307