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FACULTY PRODUCTIVITY IN SUPERVISING DOCTORAL STUDENTS' DISSERTATIONS AT CORNELL UNIVERSITY

by

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I. Introduction

Economists and academic administrators have long been concerned with issues of faculty productivity. For example, sets of studies have addressed whether faculty research productivity is related to faculty salaries (Hamermesh et. al. 1982, Hamermesh 1988), whether gender differences in faculty salaries remain after one controls for research productivity (Ginther and Hayes 2003, Thilmany 2000), and whether a negative association between faculty salary and seniority at an institution is due to universities having monopsony power or due to declining faculty research productivity with seniority (Bratsberg, Ragan and Warren 2003, Moore, Newman and Turnbull, 1998).

To take another example, concern that the ending of mandatory retirement, which became effective for tenured faculty in January 1994, would lead to an aging nonproductive faculty has led other researchers to examine how faculty research and teaching productivity, the latter measured by undergraduate student evaluations, have varied over the life cycle (Rees and Smith 1991, Levin and Stephan 1991). More recently, researchers studied whether declining research productivity is related to the acceptance of an offer for an early retirement incentive (Kim 2002). Finally, other researchers have looked at how faculty research productivity varies across cohorts, finding that when a scientist enters the labor market has a substantial effect on his or her productivity over the life cycle and that more recently educated cohorts are not necessarily more productive than earlier cohorts (Levin and Stephan, 1991, Stephan and Levin 1992).

While some studies have looked at the implicit role that PhD student production has on the quality rankings of PhD programs (e.g. Ehrenberg and Hurst 1998), to our knowledge no studies have focused on how the distribution of PhD student supervisory responsibilities varies across faculty members at a university. Our study uses data on all PhDs produced during a 7-year period at Cornell University to illustrate how researchers can study whether the degree of inequality in PhD student supervision across faculty members within a broad field of study, varies across fields, as well as what the determinants are of differences in PhD student supervision responsibilities across individual faculty members within each broad field. Of particular concern to us, given the elimination of mandatory retirement, is how faculty members' productivity in the supervision of PhD students varies over their life cycles.

II. Background Data

Each doctoral student at Cornell chooses a special faculty committee consisting of a chair and two (or more) other faculty members that supervise the student's graduate study and dissertation. The composition of a student's committee may change during his or her tenure at the university. The Cornell Graduate School provided us with a listing of each of the PhD's the university granted during the January 1996- December 2002 period, the field in which the degree was granted, and the chair and other members of each student's committee at the time the dissertation was approved. We were also granted access to the names of all of the tenure and tenure track faculty members who were present at Cornell anytime during the November 1995 to November 2002 period. This permitted us to compute the number of times that each faculty member served as chair of a student's PhD committee, as minor member of a student's PhD committee or as either a chair or a minor member during the period.

Table 1 provides some descriptive statistics. During the period, there were a total of 2986 PhDs granted on Cornell's Ithaca campus whose committee chairs were Cornell tenured or tenure track faculty members.[1] The numbers varied across broad disciplinary areas with 359 coming in the humanities, 687 in the social sciences, 892 in the biological sciences and 1048 in the physical sciences and engineering. As the first column of table 1 indicates, the comparable numbers of tenure and tenure track faculty members present at Cornell anytime during the period were 309, 607, 602 and 457, respectively.

Column 2 of the top panel of the table indicates that the mean number of PhD committees that each faculty member chaired during the period varied from 1.13 in the social sciences to 2.29 in the physical sciences. However, as the remaining columns of the table indicate, these means obscure the wide variation in dissertation supervision responsibility across faculty members. For example, during the period, 58.6% of humanities faculty members, 44.9% of biology science faculty member, 62.1% of social science faculty members and 36.1% of physical science and engineering faculty members did not chair any PhD committees. Even at a major research university a substantial fraction of faculty members chair no PhD committees during a 7 year period. However, some faculty members chair a lot; the maximum number of dissertation committees chaired by a faculty member varied from 12 in the biological sciences to 19 in the social sciences during the period.

[1] These are the PhD committees that were chaired by Cornell tenured or tenure track faculty. At Cornell emeritus faculty members, as well as former faculty members who left the university within the last year, are allowed to continue to chair committees. Emeritus faculty and faculty members who were previously at Cornell also can serve as minor members on committees, as can faculty at other universities and other individuals who have been granted permission to play this role (e.g. senior research associates). During the period, there were 152 committees, which represents 4.8% of the 3138 PhDs granted in total on the Ithaca campus, that were chaired by individuals other than Cornell tenured or tenure track faculty members.

The second and third panels of the table present comparable numbers for the number of PhD students on whose committees each faculty member served as a minor member and the sum of the number of committees for which each faculty member served as a chair or a minor member. The mean number of committees on which faculty members served as minor members during the period varied from about 2.3 in the social sciences to 4.5 in the physical sciences. Again there is wide variation across individual faculty members, with at least one biological scientist serving as a minor member for 47 PhD recipients during the period and 44% of social science faculty members never serving as minor members during the period.

III. Inequality in PhD Student Supervision

How unequally distributed is the supervision of PhD students across faculty members within each of the different subject matter areas at Cornell? Each of the panels of table 2 presents cumulative frequency distributions that show how (within a field) the cumulative distribution of faculty members varies with the cumulative distribution of the share of PhD committees that that percentage of faculty members chairs, serves as a minor member, or either chairs or serves as a minor member. So, for example, the top 10% of humanities faculty members chaired 51% of all humanities PhD committees during the period, the top 10% of biological sciences faculty members chaired 39% of the PhD committees in the biological sciences, the top 10% of social sciences faculty members chaired 55% of the PhD committees in the social sciences and the top 10% of physical sciences faculty members chaired 37% of all physical sciences PhD committees in the physical sciences.

Figures 1, 2 and 3 summarize these cumulative distributions graphically for the 4 fields for committee chairs, committee minor memberships, and total committees served on, respectively. Each figure summarizes the data for each of the four fields in the form of a *Lorenz curve* that ranks faculty in terms of their "productivity". For example, figure 1 ranks faculty from most committees chaired to least committees chaired, and shows how as the cumulative percentage of faculty increase, the cumulative percentage of committees chaired increases.

If all faculty members in a field shared equally in the supervision of PhD students, the Lorenz curve would be a 45 – degree line.[2] The more convex the Lorenz curve is for a field, the more unequal the distribution of PhD supervision responsibilities is across faculty members. If the Lorenz curve for one field is always closer to a 45- degree line (less convex) than the Lorenz curve for a second field, than one can unambiguously state that PhD student supervision responsibilities are more equally distributed in the first field than they are in the second. However, if two Lorenz curves intersect, one cannot make any unambiguous statements about which field has the more equal distribution of PhD student supervisory responsibilities from the graphical display of the data.

Each of three figures appears to tell the same story. PhD student supervisory responsibilities are most equally distributed across faculty in the physical sciences and least equally distributed across faculty in the social sciences. The biological sciences and the humanities lie between the physical and social sciences, but we cannot make any

[2] Ehrenberg and Smith (2003), appendix 14A presents a discussion of Lorenz curves and Gini Coefficients.

unambiguous statements about these two fields from this graphical display of the data because their Lorenz curves intersect. [3]

Why might PhD supervision responsibilities be more unequally distributed in the social sciences than in the physical sciences? One reason is that faculty in several social science fields, for example law, business and hotel administration, have heavy responsibility for professional degree programs and few PhD students. However, when we eliminated these faculty and their PhD students from the analyses, this did not change our conclusion.

A second reason is that the size of the PhD programs relative to the number of faculty members varies between the physical and social sciences. As table 1 indicates, the number of PhD students chaired per faculty member in the physical sciences (2.29) was twice the number in the social sciences (1.13). Because any faculty member has limited time, he may limit the number of committees he chairs. Such constraints on student's choice of chairs may be more binding in the physical sciences because of the higher PhD student/faculty ratio than in the social sciences. PhD students prefer to work with the best faculty in their fields; however, if they are constrained from doing so they will seek out other faculty to be their chairs.

A third reason may be that the faculty members in the physical sciences at Cornell are more homogenously high academic performers than are their colleagues in the social sciences. The 1995 National Research Council Survey of the quality of graduate faculty

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[3] One can, however, do so by computing the corresponding Gini coefficient for each Lorenz curve. The Gini coefficient is the ratio of the area between the Lorenz curve and a line of perfect equality (a 45% line) to the total area under the line of perfect equality. With a perfectly equal distribution, the Gini coefficient would equal zero and the higher a Gini coefficient is the more unequal a distribution is. We computed Gini coefficients from our data and they are reported in appendix table 1. The Gini coefficient is always lowest for the physical sciences and highest for the social sciences. The humanities and the biological sciences'

in the arts and science and engineering fields ranked most of Cornell's physical science and engineering fields, but none of its social science fields, in the top 10 in the nation.[4] Prior research has shown that within a field, programs that are higher rated tend to have higher average academic performance among faculty (as measured by publications, citations and grant receipt) and a lower dispersion of academic performance across faculty members.[5] If faculty members are more homogeneous, in terms of their academic performance in a field, students will have a greater fraction of the faculty in the field to choose among when seeking PhD advisors.

Finally, the difference in the inequality of PhD supervision responsibilities between the physical and the social sciences may reflect differences in the way research is conducted and graduate study is financed in the two broad fields. Physical science research often requires access to laboratory equipment found in individual faculty members' labs and there are limitations on the number of students that a faculty member can incorporate into her lab team. In contrast, most empirical social science research involves use of publicly available data bases and statistical packages and if a faculty member takes on more graduate students in the social sciences, this does not reduce her existing students' access to research facilities.

Similarly, a larger fraction of PhD students in the physical sciences than in the social sciences are supported as research assistants on external research grants that faculty members receive. A high proportion of physical science faculty members have research grants and support graduate students on their grants; indeed admissions committees may

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coefficients lie in the middle, with the biological sciences showing a more equal distribution than the humanities for chairs, but a less equal distribution for minor committee membership

[4] Goldberger, Maher and Flattau (1995)

[5] Ehrenberg and Hurst (1998)

tweak admissions processes to make sure that faculty with grants have students who want to work with them. In contrast, a much smaller fraction of social science PhD students are supported as research assistants; many more are supported as teaching assistants out of institutional funds and their financial support is independent of their advisors. For example, in the fall of 2001 44% of all doctoral students in the physical sciences at Cornell were supported as research assistants, but only 27% of the social science doctoral students were.[6] Because advisors in the social sciences less often have responsibility for providing financial support for their students, this may allow the best social science faculty to take on more PhD students than the best physical science faculty.

IV. Why Does Faculty Productivity in Supervising PhD Students Vary Across Faculty Members Within a Broad Field?

In addition to being granted access to the names of the faculty members associated with each PhD granted by Cornell University during the 1996- 2002 period, under the condition that we would not make the data for any individual faculty member public, we also were granted access to a number of variables relating to each tenure or tenure track faculty member present at Cornell anytime during the November 1995 to November 2002 period from the Cornell University faculty data base. This permitted us to estimate models to explain why, within each broad field, the number of PhD committees that a faculty member chaired during the period, served as a minor member or served in any capacity (the sum of the first two measures) varied across faculty members.

$$(1)\ S_{ijk} = a_{0ij} + a_{1ij}\,YEARS_k + a_{2ij}SEX_k + a_{3ij}TEN_k + a_{4ij}NAME_k + a_{5ij}CUEXP_k + a_{6ij}CUEXP2_k + a_{7ij}OTHEXP_k + a_{8ij}ASST_k + a_{9ij}ASSOC_k + a_{10ij}d_k + e_{ij}$$

[6] Cornell University Graduate School (2002), table E10.

Equations (1) specify that the number of times during the January 1996 to December 2002 period (S) that faculty member k in field j served as a chair (i=c), minor member (i=m), or as either a chair or a minor member (i=t) of a student who was granted his PhD during the period are each linear functions of the number of years that the faculty member was at Cornell during the period (YEARS), a dichotomous variable indicating the faculty member's gender (SEX), a dichotomous variable indicating whether the faculty member was hired at the university directly into a tenured position (TEN), a dichotomous variable indicating whether the faculty members holds a named chair (NAME), the faculty member's years of experience at Cornell as of the end of the period (CUEXP) and years of Cornell experience squared (CUEXP2), the number of years of other experience that a faculty member had after his terminal degree prior to coming to Cornell (OTHEXP), dichotomous variables for whether the faculty member was an assistant or an associate professor at the end of the period (ASST, ASSOC), a vector of dichotomous variables indicating the department within the broad field that the faculty member was from (d) and a random error term (e).

Estimated coefficients for each of the three equations and four fields appear in table 3 and we briefly summarize our findings here.[7] First, YEARS varies across faculty members in the sample because some faculty members were hired after November 1995, some departed permanently before November 2002, and some were on unpaid leave during part of the period. Other factors held constant, we expect that the greater the

[7] To keep the tables manageable, we exclude the coefficients of the departmental variables. Many of them proved to be statistically significantly different from zero, which indicates that faculty supervisory responsibilities for PhD students varied across departments during the period. Copies of more detailed tables that contain these coefficients are available from us on request (pmc28@cornell.edu).

number of years during the period that a faculty member was at Cornell, the greater the number of PhD students she would supervise. We find statistically significant and positive relationships between all three measures of faculty productivity in the physical and biological sciences, smaller and less significant positive relationships for the social sciences and no statistically significant relationship between years at Cornell and graduate student supervision in the humanities. This suggests that research supervision of humanists is less tied to time and place than it is in other fields.

SEX is included in the model to see, holding all other factors constant, if a faculty member's gender influences the faculty member's productivity in graduate student supervision. SEX takes on the value of one for female faculty and zero for male faculty and its coefficient is never statistically significantly different from zero. On average, male and female faculty at Cornell do not differ in their propensities to chair or serve as minor members of PhD students' committees.

Of course the importance of a faculty member's gender may depend upon the relative gender balance of a department's doctoral students and its faculty members. If female students prefer female mentors, when the proportion of female faculty is less than the proportion of female students, one might expect female faculty to supervise more PhD students than their male colleagues. However, if the proportion of female faculty is greater than the proportion of female students, just the reverse might happen.

To test if this occurred, we re-estimated equation (1) for each field, multiplying the SEX variable by the difference between the proportion of female faculty and the proportion of female students. This variable never proved to be statistically significantly different from zero for the biological sciences, the physical sciences, and the social sciences. Only for the number of PhD committees chaired by humanities faculty members did we find evidence of a statistically significant negative relationship. Thus, preferences of faculty and PhD students to work with an individual of the same gender manifest themselves at Cornell only in the humanities.

Typically, faculty members whose first appointment at Cornell was with tenure are established scholars with extremely strong research records. On average, one might expect that their research productivity is higher than those of their colleagues at comparable stages of their career who were promoted to tenure within the university. Faculty members voting on tenure decisions have much better information about other aspects of faculty performance (teaching, extension and service to the university and the profession) for internal candidates than they do for external candidates and thus will typically only make external tenured appointments to people who are unquestionably strong in research. So the association between coming to the university directly with tenure and productivity in supervision of PhD students, other factors held constant, may tell us something about the correlation between faculty research productivity and productivity in PhD student supervision. However, the estimates in table 3 never indicate that there is a statistically significant association between coming to the university directly with tenure (TEN) and productivity in PhD student supervision. Indeed, for the social sciences, the relationship is statistically significant and negative.

Perhaps a better measure of faculty research productivity that is available to us is whether the faculty member holds a named chair (NAME). This is not a perfect measure because named chairs may be reserved for faculty in particularly narrow subject areas and faculty in these areas may not be the most productive in their broader field, some units at the university place heavy weight on seniority in the assignment of chairs, other units use named chairs as an inducement to keep faculty with outside offers from other universities from leaving, and the ratio of named chairs to faculty lines varies widely across departments at Cornell. However, our findings do indicate that, other factors held constant, named chairs chaired more PhD students' committees than other faculty during the period in all 4 fields, with the greatest impact of having a named chair being observed in the physical science where, other factors held constant, having a named chair was associated with chairing about 1.8 more PhD student committees during the period.

Years of experience at Cornell (CUEXP) was entered into the model in quadratic form to allow for the possibility that a faculty members' productivity in supervising PhD students initially increases as his experience increases, peaks as the rate of increase gets smaller, and ultimately begins to fall. From equation (1) the impact of an additional year of Cornell experience on productivity in supervising PhD students is given by the expression $a_5 + 2a_6CUEXP$. If the coefficient a_5 proves to be positive and the coefficient a_6 proves to be negative in a model, the model predicts that a faculty member's productivity in supervising PhD students will first increase and then decrease as the faculty member's experience at Cornell increases. Moreover, the age at which faculty PhD supervisory productivity peaks (CUPEAK), is given by

(2) $CUPEAK = -a_5/2a_6$.

For all four fields and all three measures of faculty productivity in supervising PhD students, the estimated coefficients for CUEXP are positive and those for CUEXP2 are negative, as we hypothesized. Faculty members' productivity in supervising PhD students does vary, on average, over their careers at Cornell, first increasing, eventually peaking and then decreasing. Table 4 makes use of the coefficient estimates for each model and equation (2) to obtain an estimate at the age at which faculty productivity "peaks" for each field and each measure of productivity. Focusing on the results for number of PhD committees chaired, the number of years of experience at Cornell at which faculty productivity peaks, on average, ranges from 15.3 in the biological sciences to 18.0 in the social sciences.

The number of years a faculty member spent after receiving her highest degree before coming to Cornell (OTHEXP), other variables held constant, is statistically negatively associated with the number of PhD students the faculty member supervised in the humanities and the biological sciences, but is unrelated to the number of students supervised in the physical and social sciences. Recalling that we have already controlled for whether the faculty member's first appointment at Cornell was at the tenure level, these results suggest that if prior experience is not captured in an initial tenured appointment, the faculty member is unlikely to prove to be above average in PhD student supervisory responsibilities.

The last two variables included in the model are whether the faculty member was an assistant (ASST) or an associate (ASSOC) professor in the last year that he was observed in the sample.[8] Recalling that the omitted category (to avoid collinearity) is being a full professor and that the faculty member's years at Cornell is already included in the model, being an assistant or an associate professor is likely to represent less research productivity. As such, it is not surprising that being in one of these ranks is

[8] Several faculty members in the social sciences were initially appointed as acting assistant professors (usually pending completion of their PhDs) and so a dichotomous variable for this status was also included in the social science equation.

associated with less PhD supervisory responsibility in all four fields, with the reduction being greater for assistant professors than associate professors.[9]

V. Concluding Remarks

Our findings should be considered only illustrative because they make use of data from a single major research university. Nevertheless, they indicate that PhD student supervisory responsibilities are unequally distributed both across broad fields and within each broad field at the university and that substantial fractions of tenured and tenure track faculty fail to chair or serve as a minor member of any PhD committees during a 7 year period. The degree of inequality within a field varies across the fields and we offer some explanations for why this may be true.

Across faculty members in a given field, productivity in supervising PhD students varies systematically with several measures that reflect on the research productivity of the faculty members; on average more productive researchers supervise the research of more PhD students. Moreover, we find that the number of PhD students that a faculty member supervises appears to vary systematically over the faculty member's life cycle at Cornell, with productivity first increasing and then decreasing with years at Cornell. In particular, the number of years at Cornell at which a faculty member's productivity in supervising PhD students peaks varies across fields from about 15.3 in the biological sciences to 18.0 in the social sciences. While one cannot say with certainty that that would continue to

[9] The estimates reported in table 4 ignore the fact that the dependent variables can not be less than zero. When there is a lower bound on a dependent variable, it is more appropriate to estimate a model that takes account of this constraint such as a Tobit model (see Jeffrey Wooldridge (2002)). Estimated coefficients from the Tobit model are found in the appendix. While the interpretation of these coefficients is slightly different (the coefficients now reflect both the impact of a variable on the probability that an outcome is nonzero and its impact on the outcome given that the outcome is positive), the main the results are very similar to those found in table 4. The major differences are that faculty in the humanities whose first appointment at Cornell was with tenure now appear to be more likely to serve as chairs of PhD committees

occur if in response to the end of mandatory retirement faculty retire at later ages and thus tend to have longer careers at Cornell, this finding should cause universities to worry as more and more of their faculty pass the peak PhD supervision faculty age. Finally, we find evidence only for the humanities that the gender balances of the PhD student and faculty populations influence the numbers of PhD students that male faculty members supervise relative to the number of students that female faculty members supervise.

We encourage other researchers to conduct similar analyses as ours for other universities. More generally, we encourage others to study whether measures of faculty productivity in the supervision of PhD students can be usefully incorporated into more general analyses of faculty productivity and compensation.

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and female physical scientists now appear to be less likely to serve as minor members on PhD committees, both results holding other variables constant.

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Table 1

Summary Statistics for Faculty Productivity in Producing PhDs by broad field at Cornell:

January 1996 – December 2002

	Number of Professors	Mean Number of PhDs Supervised	Standard Deviation	Percentage of Faculty with Zero	Maximum Number of PhDs Supervised
Chairperson					
Humanities	309	1.162	2.061	58.6	18
Biological Sciences	602	1.482	1.930	44.9	12
Social Sciences	607	1.132	2.144	62.1	19
Physical Sciences	457	2.293	2.771	36.1	17
Minor Member					
Humanities	309	2.375	3.253	42.1	16
Biological Sciences	602	2.857	4.349	37.2	47
Social Sciences	607	2.282	3.829	44.0	35
Physical Sciences	457	4.525	5.325	23.9	30
Total					
Humanities	309	3.537	4.719	39.2	27
Biological Sciences	602	4.339	5.542	28.1	52
Social Sciences	607	3.414	5.379	38.7	42
Physical Sciences	457	6.818	7.349	18.6	42

Figure 1

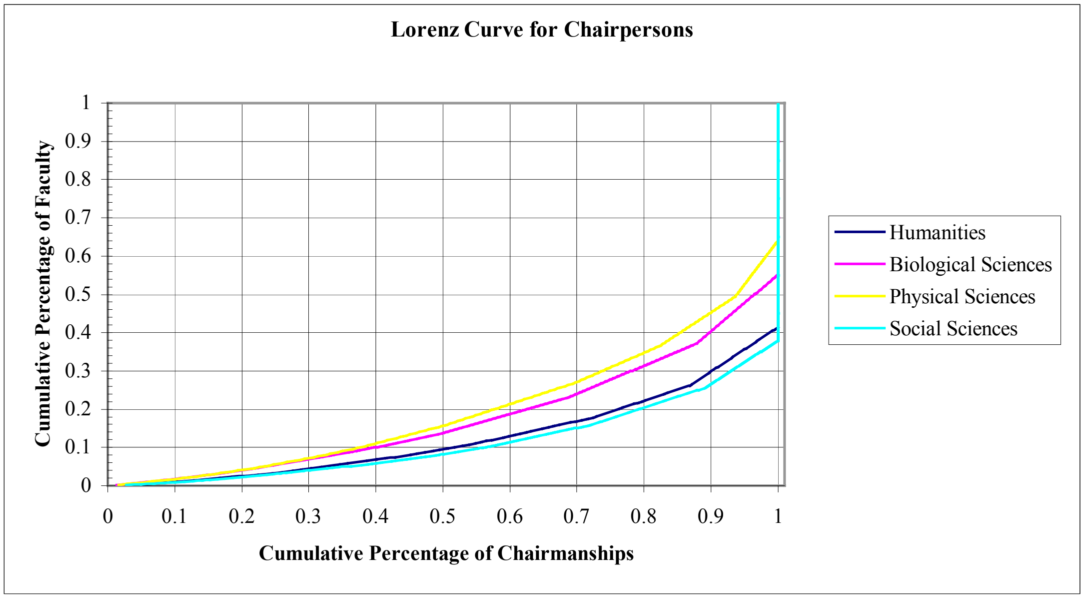


Figure 2

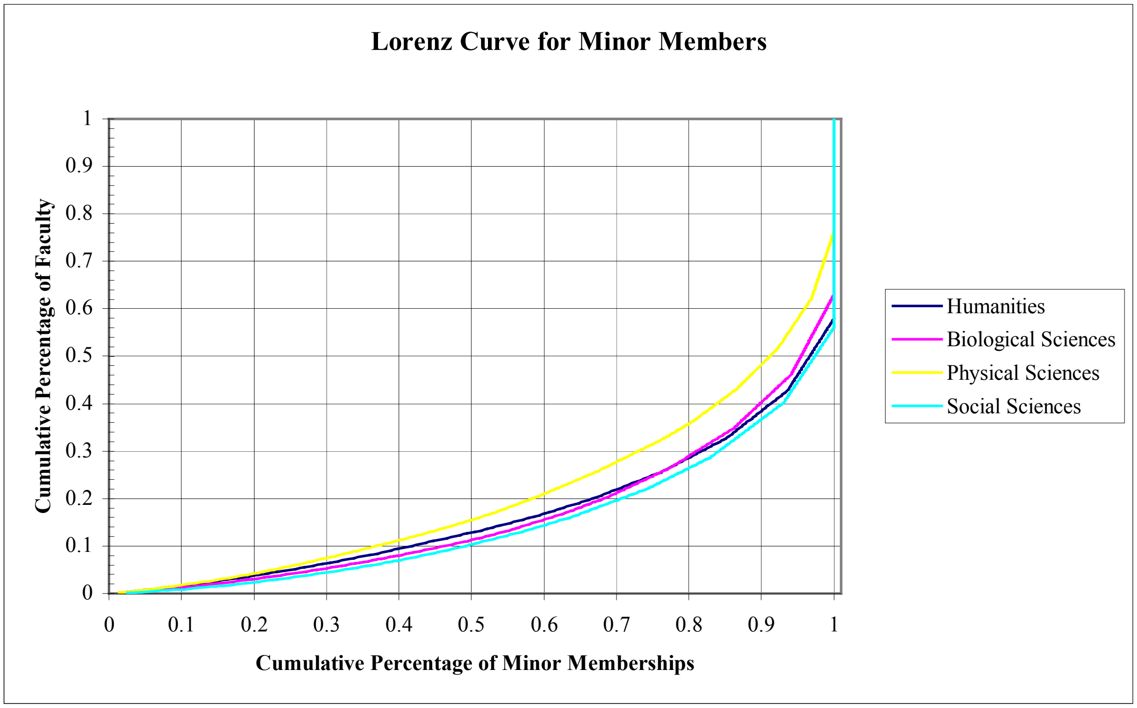
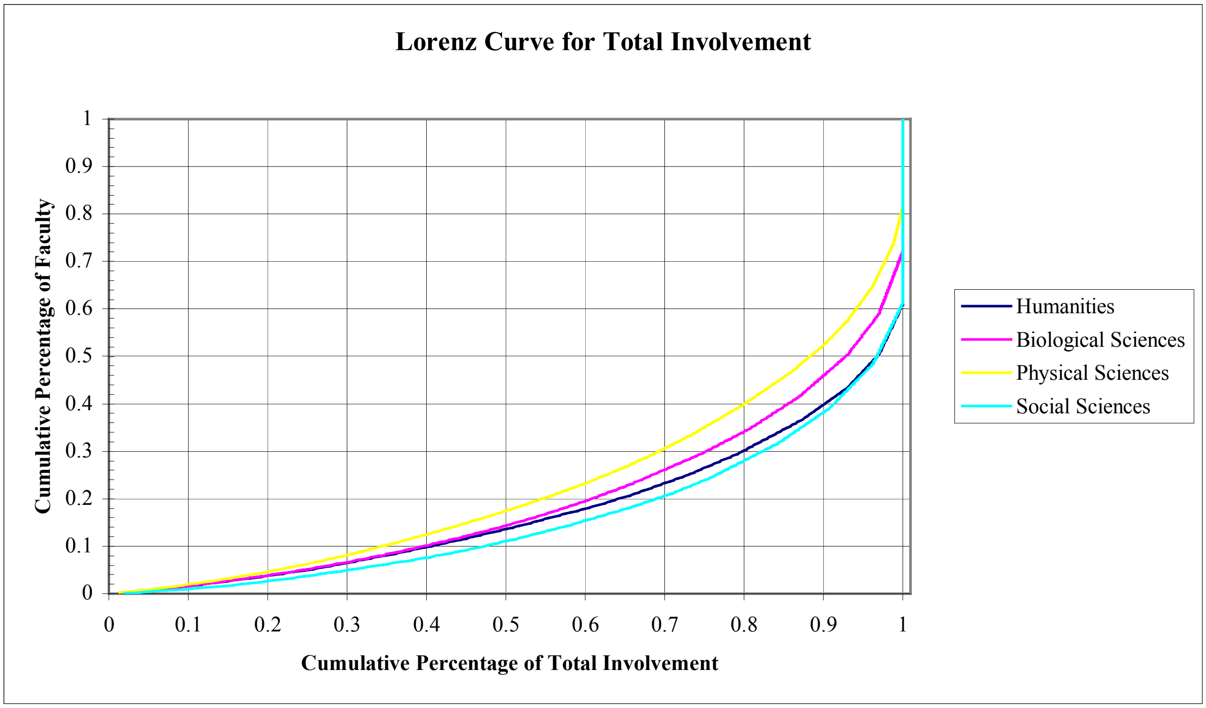


Figure 3



Lorenz Curve for Total Involvement
Cumulative Percentage of Faculty
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Cumulative Percentage of Total Involvement
Humanities
Biological Sciences
Physical Sciences
Social Sciences

Table 2

Frequency Distribution

a) **Humanities**			
Cum. % Faculty.	**Cum. % Chairperson**	**Cum. % Minor Member**	**Cum. % Total**
0%	5%	2%	2%
5%	30%	23%	23%
10%	51%	41%	40%
20%	76%	66%	64%
30%	90%	81%	80%
40%	99%	91%	90%
50%	100%	96%	97%
60%	100%	100%	100%
70%	100%	100%	100%
80%	100%	100%	100%
90%	100%	100%	100%
100%	100%	100%	100%

b) **Biological Sciences**			
Cum. % fac	**Cum. % chair**	**Cum. % minor**	**Cum. % total**
0%	1%	3%	2%
5%	23%	27%	23%
10%	39%	45%	39%
20%	62%	68%	60%
30%	78%	81%	75%
40%	89%	89%	85%
50%	96%	95%	92%
60%	100%	99%	97%
70%	100%	100%	99%
80%	100%	100%	100%
90%	100%	100%	100%
100%	100%	100%	100%

c) **Social Sciences**			
Cum. % fac	**Cum. % chair**	**Cum. % minor**	**Cum. % total**
0%	3%	3%	2%
5%	34%	31%	29%
10%	55%	48%	46%
20%	79%	70%	68%
30%	93%	84%	82%
40%	100%	92%	91%
50%	100%	97%	97%
60%	100%	100%	100%
70%	100%	100%	100%
80%	100%	100%	100%
90%	100%	100%	100%
100%	100%	100%	100%

d) **Physical Sciences**			
Cum. % fac	**Cum. % chair**	**Cum. % minor**	**Cum. % total**
0%	2%	1%	1%
5%	22%	21%	20%
10%	37%	36%	34%
20%	57%	58%	54%
30%	73%	72%	69%
40%	85%	84%	80%
50%	94%	91%	88%
60%	98%	96%	94%
70%	100%	99%	98%
80%	100%	100%	100%
90%	100%	100%	100%
100%	100%	100%	100%

Table 3

Productivity Equations[a]

a) **Humanities**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.100	0.77	0.011	0.18	0.089	1.00
SEX	0.660	1.30	0.332	1.34	0.327	0.94
TEN	1.032	1.35	0.535	1.44	0.497	0.94
NAME	1.865	2.75	1.187	3.60	0.677	1.45
CUEXP	0.446	4.40	0.106	2.15	0.340	4.88
CUEXP2	-0.012	-5.02	-0.003	-2.69	-0.009	-5.40
OTHEXP	-0.144	-3.15	-0.081	-3.63	-0.063	-2.01
ASSC	-2.130	-3.12	-1.046	-3.15	-1.084	-2.31
ASST	-2.246	-2.14	-1.394	-2.73	-0.852	-1.18
R^2 / n	0.355 / 309		0.200/309		.359/309	

b) **Biological Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.355	3.17	0.141	3.42	0.215	2.38
SEX	-0.690	-1.39	-0.063	-0.35	-0.626	-1.56
TEN	-0.341	-0.47	-0.284	-1.07	-0.056	-0.10
NAME	1.021	1.48	0.980	3.88	0.041	0.07
CUEXP	0.213	2.51	0.051	1.65	0.162	2.36
CUEXP2	-0.007	-3.48	-0.002	-2.36	-0.005	-3.23
OTHEXP	-0.130	-3.09	-0.034	-2.19	-0.096	-2.83
ASSC	-0.967	-1.81	-0.664	-3.39	-0.303	-0.70
ASST	-3.484	-4.00	-1.222	-3.83	-2.262	-3.22
R^2 / n	0.334 / 602		0.260 / 602		0.296 / 602	

c) **Physical Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.779	4.61	0.190	2.80	0.589	4.58
SEX	-0.722	-0.76	0.182	0.48	-0.905	-1.24
TEN	0.434	0.43	0.040	0.10	0.395	0.51
NAME	3.321	4.36	1.798	5.89	1.523	2.62
CUEXP	0.343	2.96	0.160	3.45	0.183	2.08
CUEXP2	-0.010	-4.24	-0.005	-4.88	-0.005	-2.99
OTHEXP	-0.116	-1.59	-0.037	-1.25	-0.079	-1.43
ASSC	-1.887	-2.06	-0.677	-1.85	-1.210	-1.74
ASST	-3.464	-2.59	-1.346	-2.51	-2.118	-2.08
R^2 / n	0.414 / 457		0.338 / 457		0.351 / 457	

d) **Social Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.210	1.87	0.045	0.97	0.165	2.01
SEX	0.185	0.41	0.137	0.74	0.048	0.15
TEN	-1.841	-2.83	-0.584	-2.18	-1.257	-2.64
NAME	2.189	3.75	1.057	4.39	1.132	2.64
CUEXP	0.234	2.79	0.082	2.38	0.152	2.47
CUEXP2	-0.007	-3.33	-0.002	-2.82	-0.004	-2.96
OTHEXP	-0.039	-0.91	-0.017	-0.96	-0.022	-0.70
ACTNG	0.504	0.15	-0.099	-0.07	0.604	0.24
ASSC	-1.907	-3.33	-0.821	-3.47	-1.085	-2.58
ASST	-3.422	-3.98	-1.363	-3.85	-2.059	-3.26
R^2 / n	0.29 / 607		0.244 / 607		0.24 / 607	

[a] Also included in each equation were departmental dichotomous variables (16 for the humanities, 27 for the biological sciences, 15 for the physical sciences and 27 for the social sciences)

Where:

YEARS	Number of years between November 1995 and November 2002 the faculty member appears in the sample
SEX	1 if female, 0 otherwise
TEN	1 if faculty member came to Cornell with tenure, 0 otherwise
NAME	1 if faculty member has a named chair, 0 otherwise
CUEXP	Number of years a faculty member has been at Cornell
CUEXP2	Number of years a faculty member has been at Cornell squared
OTHEXP	Number of years since faculty member received her PhD minus number of years at Cornell
ACTNG	1 if Acting Assistant Professor, 0 otherwise
ASSC	1 if Associate Professor, 0 otherwise
ASST	1 if Assistant Professor, 0 otherwise

(Full Professor was omitted to avoid multi-collinearity)

Table 4

Predicted Years of Cornell University Experience at
Which Productivity Reaches a Peak

Field	Chairperson	Minor Member	Total
Humanities	17.58	19.87	19.27
Biological Sciences	15.28	16.00	15.82
Physical Sciences	17.43	17.15	17.28
Social Sciences	18.00	17.74	17.83

Appendix Table 1

Gini Coefficients for Distribution of Cornell Faculty
PhD Student Chair, Minor Member Committee and
Total Committee Service: By Field, 1996-2002

Field	Chairs	Minor Member	Total
Field			
Humanities	0.74	0.66	0.65
Physical Sciences	0.60	0.58	0.54
Biological Sciences	0.64	0.67	0.61
Social Sciences	0.77	0.70	0.68

Appendix Table 2

Productivity Equations: Tobit Model Coefficients

a) **Humanities**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.171	0.89	0.020	0.15	0.166	1.19
SEX	1.099	1.49	0.689	1.27	0.663	1.26
TEN	2.081	1.96	1.705	2.27	1.212	1.58
NAME	2.560	2.77	2.070	3.29	1.019	1.51
CUEXP	0.822	5.27	0.373	3.32	0.645	5.70
CUEXP2	-0.020	-5.80	-0.010	-3.80	-0.016	-6.13
OTHEXP	-0.261	-3.76	-0.212	-3.95	-0.133	-2.68
ASSC	-2.044	-2.10	-1.631	-2.36	-0.818	-1.17
ASST	-3.788	-2.32	-4.762	-3.55	-1.441	-1.22
Chi^2 / n	207.53 / 309		152.39 / 309		197.21 / 309	

b) **Biological Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.685	4.73	0.326	4.64	0.522	3.94
SEX	-0.541	-0.85	-0.009	-0.03	-0.753	-1.30
TEN	-0.606	-0.67	-0.514	-1.19	-0.079	-0.10
NAME	1.657	1.99	1.479	3.82	0.260	0.34
CUEXP	0.416	3.74	0.160	2.90	0.340	3.35
CUEXP2	-0.011	-4.47	-0.004	-3.50	-0.009	-3.95
OTHEXP	-0.129	-2.36	-0.040	-1.52	-0.108	-2.17
ASSC	-0.695	-1.04	-0.731	-2.31	-0.037	-0.06
ASST	-5.243	-4.43	-2.626	-4.35	-3.699	-3.38
Chi^2 / n	344.56 / 602		279.15 / 602		299.20 / 602	

c) **Physical Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	1.159	6.05	0.439	4.44	0.952	6.00
SEX	-1.498	-1.28	0.002	0.00	-1.891	-1.96
TEN	0.347	0.30	-0.104	-0.18	0.382	0.42
NAME	3.190	3.81	2.274	5.49	1.386	2.05
CUEXP	0.617	4.66	0.295	4.34	0.392	3.64
CUEXP2	-0.015	-5.76	-0.008	-5.68	-0.010	-4.41
OTHEXP	-0.089	-1.06	-0.042	-0.98	-0.054	-0.79
ASSC	-1.454	-1.43	-0.595	-1.18	-0.956	-1.16
ASST	-5.275	-3.39	-2.917	-3.54	-3.619	-2.86
Chi^2 / n	344.38 / 457		269.08 / 457		290.72 / 457	

d) **Social Sciences**	**Total**		**Chairperson**		**Minor Member**	
	Coef.	**t-statistic**	**Coef.**	**t-statistic**	**Coef.**	**t-statistic**
YEARS	0.519	3.23	0.266	2.56	0.446	3.41
SEX	0.122	0.19	0.585	1.37	-0.004	-0.01
TEN	-2.275	-2.52	-1.350	-2.36	-1.337	-1.82
NAME	2.802	3.51	2.261	4.54	1.505	2.34
CUEXP	0.577	4.68	0.271	3.32	0.405	4.07
CUEXP2	-0.015	-5.09	-0.007	-3.57	-0.010	-4.45
OTHEXP	-0.031	-0.48	-0.005	-0.13	-0.037	-0.71
ASSC	-2.146	-2.69	-1.449	-2.88	-1.256	-1.96
ASST	-4.948	-3.92	-4.377	-4.82	-2.916	-2.88
Chi^2 / n	352.97 / 607		308.00 / 607		296.37 / 607	