The Changing Occupational Distribution by College Major

by

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Abstract

In this paper we examine the occupational distribution of individuals who hold bachelor degree in the United States, using data from the National Survey of College Graduates for 1993, 2003, and 2010. We propose and calculate indexes that describe two related aspects of the occupational distribution by major field of study: dissimilarity (how distinctive are the occupations of a particular major when compared with all other majors) and diversity (how varied are the occupations among those who hold a particular major), and derive asymptotic sampling distributions for these indexes. We show that the occupational distribution became more diverse between during the period for most major fields. We also examine the role that occupations play in determining relative earnings across majors.

I. Introduction

Different college degree programs train individuals for the labor market in distinct ways. Some fields of study are professionally or vocationally oriented, preparing individuals for rather specific occupations–examples are the engineering fields, accounting, and nursing. Other undergraduate courses follow the tradition of liberal arts education, in which the guiding principal is to teach people to think and write well, with little concern for what sort of work a student might do upon graduation.

The choice of college degree is influenced by desired occupation, but college degree also influences occupational choice. Research has shown that the choice of college major is responsive to the relative pay of graduates with those majors, as in Arcidiacono (2004), or Monmarquette, Canning and Majseredjian (2002). Freeman and Hirsch (2008) show that the number of students that graduate with a particular college major is responsive to the knowledge content of occupations and the market payoff to that knowledge content. Choice of occupation is also likely influenced by knowledge and skills that are learned in a course of study. For example, Yamaguchi (2010) finds evidence that college graduates know more about suitable careers than those who do not attend college, so there is less career-changing among college graduates than among high school graduates.

However, most college majors do not prepare students for particular occupations, and even for those degrees that are most occupationally oriented, there is a distribution of chosen occupations. In this paper, we examine the occupational distribution of individuals who hold college degrees in various major fields. We quantify the occupational distribution using two indices. The first is the dissimilarity index, which measures the distinctiveness of occupations held by graduates with a particular major when compared to the occupations of all other majors.

Essentially, the dissimilarity index measures the occupational segregation of majors in the labor market. The second is an index that measures the variety of occupations held by individuals whose undergraduate degree was in a specific field. On one end of the spectrum are degree fields whose graduates all have the same occupation, or nearly so. On the other end are degrees fields which are represented broadly across many occupations.

We also examine the relative pay of a variety of majors and show the differing role that occupational distribution plays in determining this relative pay.

II. Data

The primary data for this analysis comes from three waves of the National Survey of College Graduates (NSCG). The NSCG is conducted by the U. S. Census Bureau for the National Science Foundation as part of NSF's efforts to track the scientific manpower in the United States. We examine data from surveys conducted in 1993, 2003, and 2010.

The sample for the 1993 survey was drawn from individuals who responded to the long form in the 1990 Census, claimed to hold baccalaureate (or higher) degree, and who were less than 72 years old as of April 1, 1990. National Science Foundation (1993) provides details of the sampling framework. The 2003 survey used a similar sampling framework, but based on the 2000 US Census. In addition, it also drew some individuals from respondents to other National Science Foundation surveys. The details of the sampling strategy can be found at National Science Foundation (2006). This sample represents individuals who were living in the United States on October 1, 2003, who held a baccalaureate degree or higher, and who were less than 76 years old. The 2010 survey drew part of its sample from the 2009 American Community Survey respondents who indicated that they had at bachelor's degree or higher. A sample was also

drawn for the 2008 NSCG sample (which was drawn from those 2003 NSCG respondents who held a bachelor's degree in a science and engineering field prior to April 2000).

Survey instruments from the three waves are very similar, but not identical. There are slight changes in the categories for occupations and for major degree field, mostly to reflect new occupations or occupations that had grown in importance during the intervening decade. In our analysis, we have harmonized occupational definitions across the survey years.

Table 1 summarizes the demographic characteristics of the samples. This includes only individuals who reported an occupation.. The occupation of an individual is defined as the current occupation if currently employed, or the most recent occupation if the respondent is not currently working for pay. Age is slightly higher for the 2003 and 2010 sample than for the 1993 sample. The fraction non-white and the fraction Hispanic have both been increasing over time. The Asian/Pacific race group has increase significantly. The fraction holding a master's degree has also increased substantially.

III. The Occupational Distribution of College Majors

The National Survey of College Graduates asks respondents to identify the job category that best describes the respondent's main job, or the most recent job if the respondent is not currently employed. The list contains about 125 occupations. Since the purpose of the survey is to analyze the scientific workforce and focuses on degree holders, the occupations tend to be more specific in some fields and less specific in others. Occupations with typically lower educational requirements are broadly grouped in categories such as "Construction trades, miners & well drillers" or "Operators and related occupations." Thus, the spectrum of occupations that are available is narrower that we would observe in the decennial census, for example. To

compare the occupational distribution across time periods, it is necessary for us to harmonize the categories in the two surveys. Our harmonized list contains about 120 different occupations.

Figure 1 shows the distribution of occupations of economics majors compared to the occupational distribution of electrical engineering majors from 2003, using 22 highly aggregated occupational groups. (We have chosen these two majors simply as an example of two majors that have rather different occupational distributions.) Economics majors appear in all of these broad occupational categories. However, they are highly concentrated in fields related to business, particularly sales and management, which together represent over 50 percent of all jobs held by economics graduates. Economics is also a relatively popular major for judges and lawyers, and (naturally) for economists. The occupational distribution of electrical engineering majors is much more concentrated, with more than half in the engineering field, although computer related occupations, managers and sales/marketing also are fairly popular. Clearly, the distributions are different, although there are areas of significant overlap.

In order to characterize the job distributions of college graduates, we use two indexes that are familiar to economists. The first is the dissimilarity index. The index that compares major j and major k is

$$D_{jk} = \tfrac{1}{2}\sum_{i=1}^{N}\left|f_{ij} - f_{ik}\right| \tag{1}$$

where f_{ij} is the fraction of those who have a major field j in occupation i, and f_{ik} is the fraction of those who have a major field k in occupation i. This index is frequently used in economics and sociology, often to measure the amount of occupational segregation between the sexes, or between different racial groups, as in Albeda (1986), or Ransom (1991). In our analysis, we will

usually compare those in a particular major with all others who hold a different major. We refer to this value as the "Occupational Distinctiveness" of a particular major.

The dissimilarity index is easy to compute and to interpret. It ranges from 0 (if there is no distinctiveness) to 1 (completely distinctive). With reference to occupational distinctiveness, D can be interpreted as the fraction of those holding a particular major that must change occupations in order to achieve the same occupational distribution as all other majors. If D has a value of 1, the occupations held by individuals with that major are completely distinct from those who don't hold that major. If D is 0, individuals with that major have the same occupational distribution as those who do not have that major.

D is independent of the fraction of the sample having a particular major and can be compared from year to year even when the representation of particular majors in the academic labor force changes, for example. However, the index is dependent upon the definition of the occupational groups. Since occupational groups are by nature ad hoc aggregations, care must be taken when discussing changes over time. Furthermore, the index in this case is based upon a sample of college graduates, and is thus, strictly speaking, a statistic. The sampling distribution of the index is discussed in Ransom (2000). He derives and estimator for the standard error, which we use in our analysis below.

Another related aspect of the occupational distribution is its variety. In other words, how widely distributed across the occupational distribution are economics majors? One way to measure this is the Herfindahl index,

$$H = \sum_{i=1}^{N} s_{ij}^2 \tag{2}$$

where s_{ij} is the fraction of group j (say economics majors) who are in occupational group i, and where N is the total number of occupational groups. While H is normally used to measure the concentration of firms in an industry, the index is useful in our context, although its interpretation is somewhat different. Suppose all economics majors chose the same occupation, then the value of the index would be 1. Suppose, on the other hand, that there were 10 possible occupations, and economics majors were represented equally in each of them. Then the index would be

$$H = \sum_{i=1}^{N} (1/10)_i^2 = 10/100 = 1/10$$

The greater the number of occupations and the more equal the representation in each of the occupations, the lower will be the value of H. A more convenient way to interpret occupational variety is to use the inverse of H,

$$O_v = \left[\sum_{i=1}^{N} s_{ij}^2 \right]^{-1}. \tag{3}$$

In our context, we call this the index of occupational variety. If the distribution across occupations were equal for O_v occupations (of N possible occupations), O_v is exactly the number of occupations in which economics majors would need to be represented in order to obtain an index value of H.[1] One might think of O_v as the number of "effective" occupations held by individuals with a particular undergraduate major.

[1]In the context of measuring the diversity of species represented in a ecological community, O_v is called "Simpson's diversity index." (See Magurran, 1988.) The application to

As O_v is based on sample information, it is also a statistic. The sampling distribution of this index has been studied by Phipps (2010), who derives standard errors for the statistic.

Values of the occupational variety index are reported in Tables 2 for several selected large undergraduate majors. (These are the 40 largest majors in each of the three years and constitute about 70 percent of all respondents in each of the three surveys.) The values for all years are shown, as well as the changes between years. In almost all cases, the difference is statistically different from zero at the 1 percent level, although we do not report test statistics in order to keep the table legible. Table 3 reports corresponding values of the dissimilarity index.

These indices provide numerical measures of the degree of occupational orientation of a particular major. For examples, majors such as pre-medicine and nursing have extremely low values of occupational variety--less than 2, as well as very high values of distinctiveness. Pre-med and nursing have values of D close to .8 or higher. Most of the undergraduate majors that we think of as vocationally or professionally oriented have relatively low values for O_v, usually less than 5. On the other hand, some liberal arts majors have rather large values--history and English have values of O_v of about 21. Mathematics, political science and sociology have values of O_v that are quite similar to that of economics—in the mid-teens. Geology and most of the life sciences appear to be much more "professional" than mathematics or economics.

Figures 2 shows the relationship between O_v and D for the 2003 NSCG data for the same selected fields reported in Tables 2 and 3. Obviously, the most distinctive major fields also tend to have the lowest level of occupational variety. However, the relationship is not perfect. For

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occupational diversity in this context is straightforward. It was suggested as a measure of industrial concentration by Hannah and Kay (1977).

example, fields with D close to .4 have values for O_v ranging from about 13 to over 20. Among the fields with O_v less than 5, there are values of D that range from less than .6 to almost .9.

Conceptually, O_v could be low even if D were high. For example, if everyone who received a degree in accounting worked as an accountant, then O_v would have a value of 1 (very low). If graduates from other majors never became accountants, then D would also be 1 (very high). On the other hand, if accounting were a common career for all other majors, the D would be much lower. On the other hand, suppose accounting students took jobs in many different occupations, then O_v would be high. If those occupations were limited to only those with accounting degrees, then D would be very high, as well. Nevertheless, in fact the correlation between the two indices is very high (about -.90).

For the same 40 majors reported in Tables 2 and 3, Figure 3 illustrates the substantial increase in occupational variety for most majors from 1993 to 2003. (The line in the graph is the 45 degree line—values would fall near the line if variety had not increased.) Almost all majors have seen significant increases in occupational diversity between 1993 and 2003. The largest increases appear to be those with middling values of O_v—values in 1993 of between 10 and 20.

Figure 4 shows the changes in distinctiveness for the same sample of majors. As expected, distinctiveness has declined for most majors. However, those with the lowest levels of distinctiveness have become more distinct.

The estimated indexes for all 144 majors are reported in Appendix Table 1 and Appendix Table 2. Figure 5 displays the occupational variety for this larger sample of majors. Although the majority of majors have experienced increases in variety, many of them large, a few majors have seen very large decreases.

For occupational variety, it is possible to also calculate a value for all majors together. Table 4 reports this value for the three waves of the NSCG along with corresponding values from the 1990 and 2000 US Census, calculated from the 5% Public Use Microsample data, along with the 2010 American Community Survey 3-year sample. In 1993, the occupational variety for all college majors, based on the NSCG sample and the NSCG occupational definitions, is about 34. In contrast, the value of O_v for economics majors in 1993 is only about 17. Thus, economics majors show roughly half the occupational diversity that we observe among all college graduates. Liberal Arts/General Studies majors have the largest value of variety for 1993, about 26. History has a value of about 22, and English has a value of about 21. For comparison, the corresponding values for all college majors in the 1990 Census is about 35, while the value of O_v for all job-holders, including those without a college degree, is approximately 77. For all majors and for all workers, occupational variety increased significantly over the 1990s.

It is important to keep in mind that those estimates based on the NSCG and those based on the census are not strictly comparable, as the index value depends on the definition of occupational groups. We have not attempted to harmonize the occupational definitions from NSCG to the census, so the two indexes are not comparable. Also, changes in the "overall" measure for college graduates in Table 4 reflect two different sources of variety—variety within a particular major, and variation in the majors chosen. So the falling overall index from 2003 to 2010 might be due to changing college major choices, as well as changes in the distribution conditional on college major.

IV. Relative Pay by Major

The earnings of college graduates vary considerably by field of study. For example, James, et. al. (1989) document substantial variation across different major fields. In this section I examine the role of occupation in the relative pay of different majors. First of all, it is worth noting that there is a relationship between the occupational variety of a major and its mean salary. Figures 6 shows that majors with low occupational variety tend to have high salaries, although the relationship explains little of the variation in salaries across major[2]

For illustrative purposes, we examine in detail individuals who hold economics majors. Tables 5a and 5b report regression results. In each case the dependent variable is the log of annual salary, and the variable of most interest is an indicator variable for individuals who hold a bachelors degree in the field of economics. Column I of Table 5a shows that economics majors earn about 17 percent more than the average college graduate. However, this might be due to a number of factors. For example, economics is considered an excellent "pre-professional" degree, and it might be that economics majors are more likely to get advanced degrees. Or economics majors may be represented in this sample from more experienced cohorts or more advantageous demographic groups. Column II includes variables that reflect advanced degrees, work experience, as well as race and gender. After controlling for these factors, economics graduates still earn about 11 percent more than all other majors combined. Column III further adds a set of 19 dummy variables to control for broad occupational groups. Even after controlling for occupations, economics major still earn a premium of about 11 percent.

[2] Data on salaries in the NSCG are topcoded. However, for purposes here, as the degree of topcoding is small, we have ignored this issue in calculating average salaries.

Results for the 2003 sample are reported in Table 5b. The gross difference in pay, about 18 percent, is about the same for this sample as for the 1993 sample. However, less of the difference can be explained by the independent variables, with an economics premium of about 13 percent remaining.

Tables 6a and 6b report results of Oaxaca decompositions for the 10 highest paid undergraduate majors in the 1993 and 2003 NSCG samples.[3] (Details of the Oaxaca decomposition are explained in Oaxaca and Ransom (1994)). The first column in each table lists the raw average salary for all individuals in the sample holding the respective degree.[4] The highest paid groups appear to be those in the medical profession-- in fact, five of the top ten majors are typical pre-medicine degrees. The others are engineering degrees, along with physics and economics.

The second column of Table 4 reports the total salary premium for the major. The third column reports the part of the total premium that is explained by the regression model. (In this case, the regression model contains the same explanatory variables as appear in Table 3, with the exception of the indicator for economics majors.) For example, while the salary premium for the pre-medicine/pre-dental major is 61.1 percent, 54.3 percentage points (or about 89 percent of the premium) can be explained by the explanatory variables of the model. The occupation variables

[3]I have restricted this list to those majors represented in the samples by at least 250 individuals, since the Oaxaca decomposition requires the estimation of the regression model for both samples–those who have the degree and those who do not have the degree. In each case I have dropped a few small majors from the list of "top ten."

[4]The salary variable is top-coded at $150,000 for the 1993 sample. This truncation is ignored in the analysis here.

alone explain 45.6 percentage points, or about 75 percent of the premium. This result simply reflects the fact that those who graduate with a pre-health professions degree end up working in occupations that are highly paid. For most of the majors listed in Table 6a, the occupational distribution and other factors explain most of the salary premium. The exceptions are economics, biochemistry, aerospace engineering, and chemical engineering.

The results for 2003, shown in Table 4b, are qualitatively similar. However, in this case, only for biochemistry is the "unexplained" premium more than half of the explained premium. (The model explains about 61 percent of the economics premium.) But the occupational distribution explains more than half of the premium for all majors except physics and economics.

V. Conclusions

In this paper we have suggested two indices to describe the occupational distribution for undergraduate major fields. Occupational distinctiveness, D, measures the occupational segregation of individuals with a particular major. Occupational variety, O_v, measures the dispersion of individuals across occupations. Obviously, these measures are not independent, although we show that they are not deterministically linked.

The most significant finding is that occupational variety increased substantially for most majors during the past two decades. This suggests that within the occupations that are typical of a given major, the occupational distribution has become less concentrated.

We also examine the role of the occupational distribution in explaining the relative pay of major fields. In examining the highest paid undergraduate major fields, we find that the high pay of some fields can be explained largely by the occupations of individuals who hold degrees in those fields. This is particularly true of fields that are primarily pre-medicine. However, the

engineering fields, physics, and economics show a somewhat different pattern. For these fields, the high pay cannot be explained primarily by the occupations that these individuals hold.

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Table 1
Summary Demographic Statistics

Variable	1993		2003		2010	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
Age	44.64	11.97	46.86	11.82	46.59	13.34
Highest Degree:						
Bachelor	0.62	0.49	0.55	0.50	0.54	0.50
Masters	0.27	0.44	0.31	0.46	0.34	0.47
Doctorate	0.05	0.22	0.08	0.28	0.06	0.24
Professional	0.06	0.23	0.06	0.24	0.06	0.23
Female	0.41	0.49	0.43	0.50	0.44	0.50
Race:						
Native American	0.009	0.094	0.006	0.079	0.015	0.121
Asian/Pacific	0.093	0.290	0.117	0.322	0.174	0.382
Black	0.088	0.284	0.075	0.264	0.105	0.307
White	0.795	0.404	0.783	0.412	0.733	0.442
Ethnicity:						
Hispanic	0.059	0.236	0.068	0.252	0.097	0.296
Sample Size	144,218		97,608		74,549	

Table 2
Indexes of Occupational Variety for Selected Large Majors

Business	1993 Value	2003 Value	2010 Value	Change '93 to '03	Change '03 to '10	Change '93 to '10
Accounting	3.69	4.86	7.67	1.16	2.81	3.98
Business Administration and Management	12.97	18.31	15.12	5.34	-3.19	2.15
Business Marketing/ Marketing Management	12.28	15.12	11.74	2.84	-3.39	-0.55
Business, General	17.93	22.76	20.19	4.83	-2.57	2.26
STEM						
Aerospace and related Engineering	4.80	5.67	8.46	0.87	2.79	3.66
Biochemistry and Biophysics	8.58	13.06	19.22	4.48	6.16	10.64
Biology, General	11.11	12.53	24.47	1.41	11.95	13.36
Chemical Engineering	5.27	6.30	5.96	1.03	-0.34	0.69
Chemistry, except Biochemistry	9.51	10.73	8.12	1.22	-2.60	-1.38
Civil Engineering	2.72	2.60	3.42	-0.12	0.82	0.70
Computer and Information Sciences, General	6.52	6.26	7.76	-0.26	1.51	1.25
Computer and Systems Engineering	5.08	4.59	8.72	-0.49	4.13	3.64
Computer Science	5.99	5.37	7.71	-0.62	2.34	1.72
Electrical, electronics, and communication	3.78	5.23	5.87	1.44	0.64	2.08
Geology	4.17	6.65	3.90	2.48	-2.75	-0.27
Industrial engineering	8.14	10.09	12.18	1.94	2.09	4.03
Mathematics, General	19.19	17.94	16.52	-1.25	-1.42	-2.67
Mechanical Engineering	3.79	4.96	4.93	1.16	-0.03	1.14
Microbiology	11.78	18.99	22.20	7.20	3.21	10.42
Physics	19.67	20.75	22.35	1.09	1.60	2.69
Zoology, General	8.69	11.21	21.79	2.52	10.58	13.10
Social Sciences						
Anthropology and Archeology	31.30	27.36	26.25	-3.95	-1.11	-5.06
Economics	16.88	21.34	14.77	4.46	-6.57	-2.11
Elementary Teacher Education	4.26	5.68	8.55	1.42	2.87	4.29
General Psychology	19.25	19.07	24.94	-0.17	5.87	5.70
History, OTHER	24.40	26.37	23.69	1.97	-2.68	-0.72
Mathematics Teacher Education	5.73	4.17	3.92	-1.55	-0.25	-1.81
OTHER Social Sciences	18.99	26.72	25.04	7.73	-1.68	6.05
Political Science and Government	13.27	14.27	12.66	0.99	-1.60	-0.61
Secondary Teacher Education	15.72	15.05	17.86	-0.68	2.81	2.13
Social Work	3.51	4.90	6.21	1.39	1.31	2.71
Sociology	13.82	26.05	24.75	12.23	-1.30	10.93

Table 2 (continued)

Humanities						
Architecture/Environmental Design	2.74	4.27	7.37	1.52	3.10	4.63
English Language, Literature, and Letter	22.00	21.97	23.66	-0.03	1.70	1.67
OTHER Foreign Languages & Literature	22.44	18.33	27.20	-4.11	8.87	4.76
Other						
Health/Medical Technologies [non-Phd]	2.43	3.59	6.12	1.16	2.53	3.69
Liberal Arts and General Studies	28.79	34.05	29.53	5.26	-4.52	0.74
Nursing [4 or more years, non-PHD]	1.87	2.01	2.33	0.14	0.31	0.45
OTHER Health/ Medical Sciences	6.77	9.17	12.64	2.41	3.47	5.88
Pharmacy [non-Phd]	2.32	1.91	3.38	-0.41	1.48	1.06

Table 3
Indexes of Occupation Distinctiveness for Selected Large Major

Business	1993	2003	2010	Change 93 to 03	Change 03 to 10	Change 93 to 10
Accounting	0.570	0.535	0.475	-0.036	-0.060	-0.095
Business Administration and Management	0.432	0.424	0.363	-0.009	-0.060	-0.069
Business Marketing/ Marketing Management	0.474	0.468	0.424	-0.006	-0.044	-0.050
Business, General	0.387	0.384	0.363	-0.003	-0.021	-0.024
STEM						
Aerospace and related Engineering	0.600	0.560	0.512	-0.039	-0.048	-0.087
Biochemistry and Biophysics	0.620	0.596	0.468	-0.024	-0.128	-0.152
Biology, General	0.539	0.540	0.414	0.000	-0.126	-0.126
Chemical Engineering	0.590	0.556	0.541	-0.034	-0.015	-0.050
Chemistry, except Biochemistry	0.535	0.533	0.504	-0.002	-0.029	-0.030
Civil Engineering	0.702	0.711	0.661	0.009	-0.050	-0.041
Computer and Information Sciences, General	0.708	0.663	0.526	-0.044	-0.137	-0.181
Computer and Systems Engineering	0.736	0.691	0.551	-0.046	-0.139	-0.185
Computer Science	0.767	0.699	0.576	-0.069	-0.123	-0.192
Electrical, electronics, and communication	0.668	0.622	0.576	-0.046	-0.046	-0.092
Geology	0.614	0.579	0.606	-0.035	0.027	-0.008
Industrial engineering	0.513	0.485	0.466	-0.028	-0.019	-0.047
Mathematics, General	0.477	0.481	0.449	0.004	-0.032	-0.028
Mechanical Engineering	0.641	0.603	0.575	-0.038	-0.028	-0.066
Microbiology	0.626	0.548	0.476	-0.078	-0.072	-0.150
Physics	0.526	0.512	0.416	-0.014	-0.095	-0.109
Zoology, General	0.560	0.510	0.400	-0.050	-0.110	-0.159
Social Sciences						
Anthropology and Archeology	0.349	0.370	0.413	0.021	0.043	0.064
Economics	0.403	0.393	0.451	-0.009	0.058	0.048
Elementary Teacher Education	0.597	0.585	0.556	-0.012	-0.029	-0.041
General Psychology	0.333	0.371	0.404	0.038	0.033	0.072
History, OTHER	0.318	0.346	0.385	0.029	0.039	0.068
Mathematics Teacher Education	0.530	0.572	0.663	0.042	0.091	0.132
Other Social Sciences	0.346	0.363	0.411	0.017	0.049	0.065
Political Science and Government	0.393	0.421	0.446	0.027	0.025	0.052
Secondary Teacher Education	0.373	0.411	0.479	0.038	0.068	0.106
Social Work	0.580	0.578	0.558	-0.003	-0.020	-0.022
Sociology	0.375	0.364	0.403	-0.011	0.040	0.029

Table 3 (Continued)

Humanities						
Architecture/Environmental Design	0.656	0.594	0.516	-0.062	-0.079	-0.141
English Language, Literature, and Letter	0.367	0.393	0.408	0.026	0.015	0.041
Other Foreign Languages & Literature	0.342	0.399	0.411	0.057	0.012	0.069
Other						
Health/Medical Technologies	0.710	0.656	0.573	-0.054	-0.083	-0.137
Liberal Arts and General Studies	0.256	0.268	0.267	0.011	-0.001	0.010
Nursing (4 or more years)	0.780	0.765	0.712	-0.016	-0.052	-0.068
Other Health/ Medical Sciences	0.586	0.549	0.497	-0.036	-0.052	-0.088
Pharmacy	0.724	0.758	0.601	0.033	-0.157	-0.123

Table 4

Occupational Variety Index Values
All Majors an All Workers

NSCG RESULTS		CENSUS RESULTS		
Year	All College Grads	Year	All Workers	All College Grads
1993	34.4747	1990	76.59	36.63
2003	42.29902	2000	89.31	46.51
2010	36.51126	2010	83.70	45.42

Table 5a
Regression Estimates of Salary Model
1993 Sample Year
Dependent Variable is Log of Annual Salary

	I		II		III	
Variable	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Economics Major	0.16996	0.01333	0.10951	0.01222	0.11120	0.01175
Age			-0.00484	0.00026	-0.00092	0.00025
Master's Degree			0.08739	0.00299	0.11301	0.00291
Doctoral Degree			0.55600	0.00694	0.53101	0.00899
Professional Degree			0.16858	0.00598	0.21755	0.00630
Work Experience			0.03974	0.00057	0.03589	0.00054
Experience Squared			-0.00061	0.00001	-0.00059	0.00001
Female			-0.21186	0.00287	-0.12928	0.00301
Asian			0.02975	0.00467	-0.00897	0.00446
Native American			-0.14993	0.01489	-0.10009	0.01418
Black			-0.12255	0.00445	-0.08077	0.00424
Hispanic			-0.10640	0.01710	-0.08234	0.01598
Pacific Islander			-0.04112	0.03353	-0.01050	0.03125
Other Race			-0.06889	0.01213	-0.02148	0.01157
Intercept	10.66534	0.00157	10.45975	0.00854	10.34972	0.03388
Indicators for 20 Broad Occupation Groups	No		No		Yes	
R^2	0.0017		0.2426		0.4197	

Table 5b
Regression Estimates of Salary Model
2003 Sample Year
Dependent Variable is Log of Annual Salary

	I		II		III	
Variable	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Economics Major	0.1849261	0.03235	0.12563	0.02333	0.13130	0.02191
Age			-0.00795	0.00053	-0.00480	0.00050
Master's Degree			0.16299	0.00736	0.18119	0.00720
Doctoral Degree			0.34746	0.00993	0.47511	0.01174
Professional Degree			0.66346	0.01233	0.67482	0.01683
Work Experience			0.04124	0.00117	0.03662	0.00111
Experience Squared			-0.00084	0.00003	-0.00075	0.00003
Female			-0.44690	0.00624	-0.31316	0.00637
Asian			0.04774	0.00913	-0.03095	0.00881
Native American			-0.02219	0.03463	0.01620	0.03204
Black			-0.04389	0.01113	-0.01281	0.01067
Hispanic			-0.07375	0.01069	-0.04301	0.01012
Pacific Islander			-0.08291	0.04875	-0.07660	0.04567
Other Race			-0.06275	0.02404	-0.03932	0.02286
Intercept	11.37208	0.00442	10.90081	0.01862	10.34972	0.03388
Indicators for 20 Broad Occupation Groups	No		No		Yes	

Table 6a
Decomposition of Salary Premium for Highest Paid Undergraduate Majors*
1993 Sample Year

Undergraduate Major	Average Salary	Salary Premium (%)	Explained by Model: All Variables	Explained by Model: Occupation Variables Alone	Unexplained	Fraction Explained by All	Fraction Explained by Occupation
Pre-Medicine/Pre-Dentistry & Etc.	92,405	61.1	54.3	45.6	6.8	0.889	0.747
Medicine/Dentistry & Etc.	79,138	43.7	52.2	41.7	-8.6	1.197	0.956
Zoology	63,756	20.6	22.9	19.6	-2.3	1.110	0.949
Chemical Engineering	62,103	28.7	7.9	5.9	20.9	0.274	0.205
R^2		0.0003		0.1212		0.2131	
Chemistry	61,019	21.5	13.5	10.2	0.8	0.630	0.472
Aerospace Engineering	61,010	25.7	10.3	5.1	15.4	0.401	0.198
Physics	60,780	24.7	17.5	10.2	7.2	0.708	0.414
Biochemistry	60,729	16.8	6.4	14.5	10.5	0.377	0.859
Engineering, general	59,506	22.8	14.9	11.0	7.9	0.654	0.484
Economics	58,979	17.0	7.9	8.0	9.1	0.464	0.471

*Only majors represented by at least 250 individuals in the sample are included here. Variables used in the decomposition are age, work experience, square of work experience, sex, race and advanced degrees held, along with twenty broad occupational categories. Dependent variable is logarithm of salary. For each major, the coefficients used to explain differences are estimated from the "all other majors" group.

Source: Author's calculations from the National Survey of College Graduates, 1993.

Table 6b
Decomposition of Salary Premium for Highest Paid Undergraduate Majors*
2003 Sample Year

Undergraduate Major	Average Salary	Salary Premium (%)	Explained by Model (%) All Variables	Occupation Variables Alone	Unexplained (%)	Fraction Explained by All	Fraction Explained by Occupation
Pre-medicine, Dental, Etc.	141,488	62.3	47.5	40.1	14.8	0.762	0.643
Medicine, dental & etc.	99,028	25.5	37.4	32.8	-12.0	1.470	1.289
Zoology	97,085	25.0	19.9	17.2	5.0	0.798	0.691
Biochemistry	94,359	30.2	12.7	15.8	17.5	0.420	0.522
Computer & Systems Engineering	87,236	35.2	29.2	20.0	6.1	0.828	0.568
Economics	86,833	21.4	13.0	9.9	8.4	0.608	0.461
Physics	86,399	33.5	18.7	15.5	14.8	0.559	0.463
Electrical & Electronics Engineering	86,200	38.5	26.9	20.4	11.6	0.699	0.530
Biology (general)	84,165	12.7	11.2	13.0	1.5	0.883	1.024
Chemistry	83,784	21.6	14.9	13.6	6.7	0.690	0.632

*Only majors represented by at least 250 individuals in the sample are included here. Variables used in the decomposition are age, work experience, square of work experience, sex, race and advanced degrees held, along with twenty broad occupational categories. Dependent variable is logarithm of salary. For each major, the coefficients used to explain differences are estimated from the "all other majors" group.

Source: Author's calculations from the National Survey of College Graduates, 2003.

Figure 1:
Occupational Distribution of Economics Majors and Electrical Engineering Majors

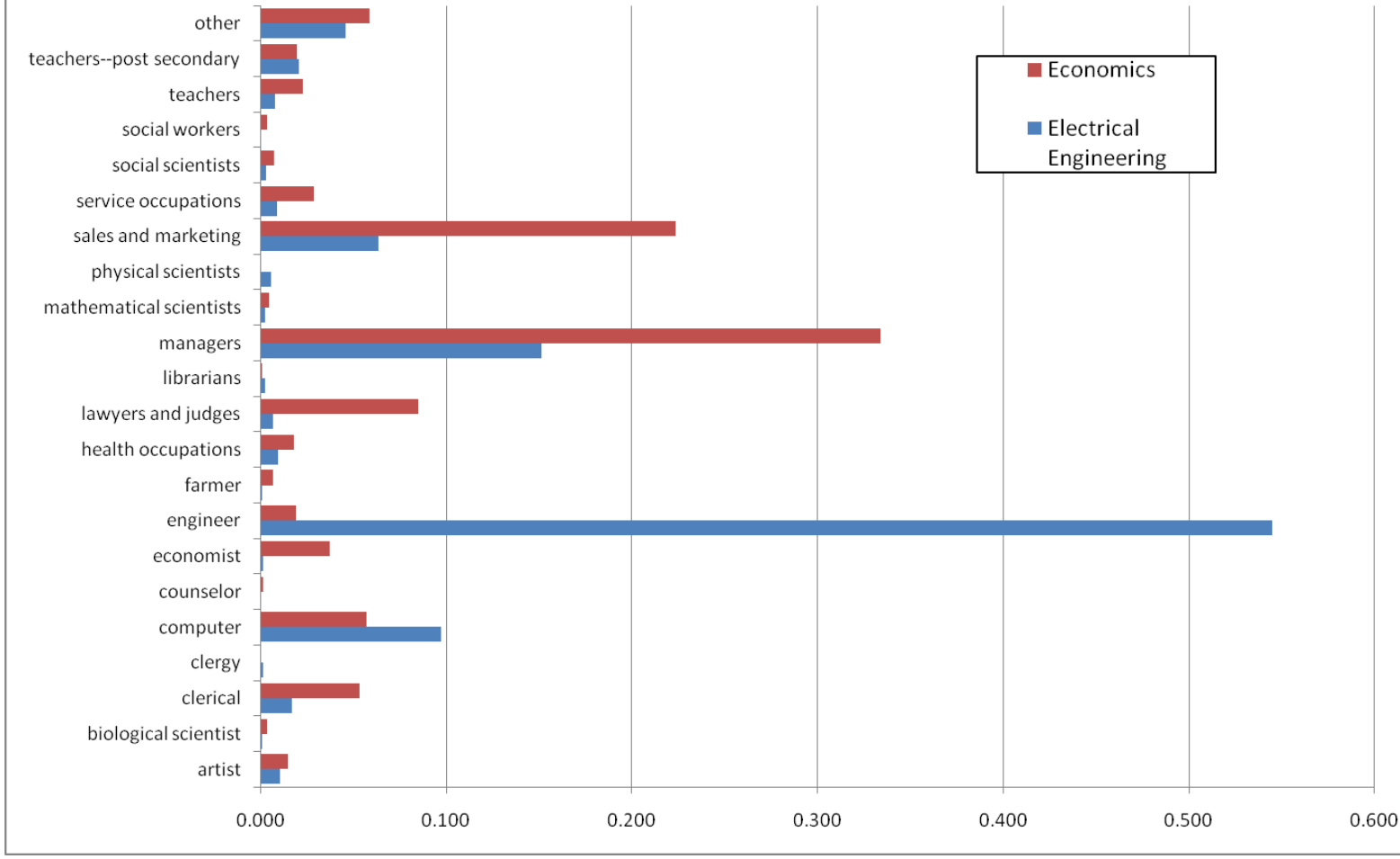


Figure 2: Relationship between D and Ov (2003)

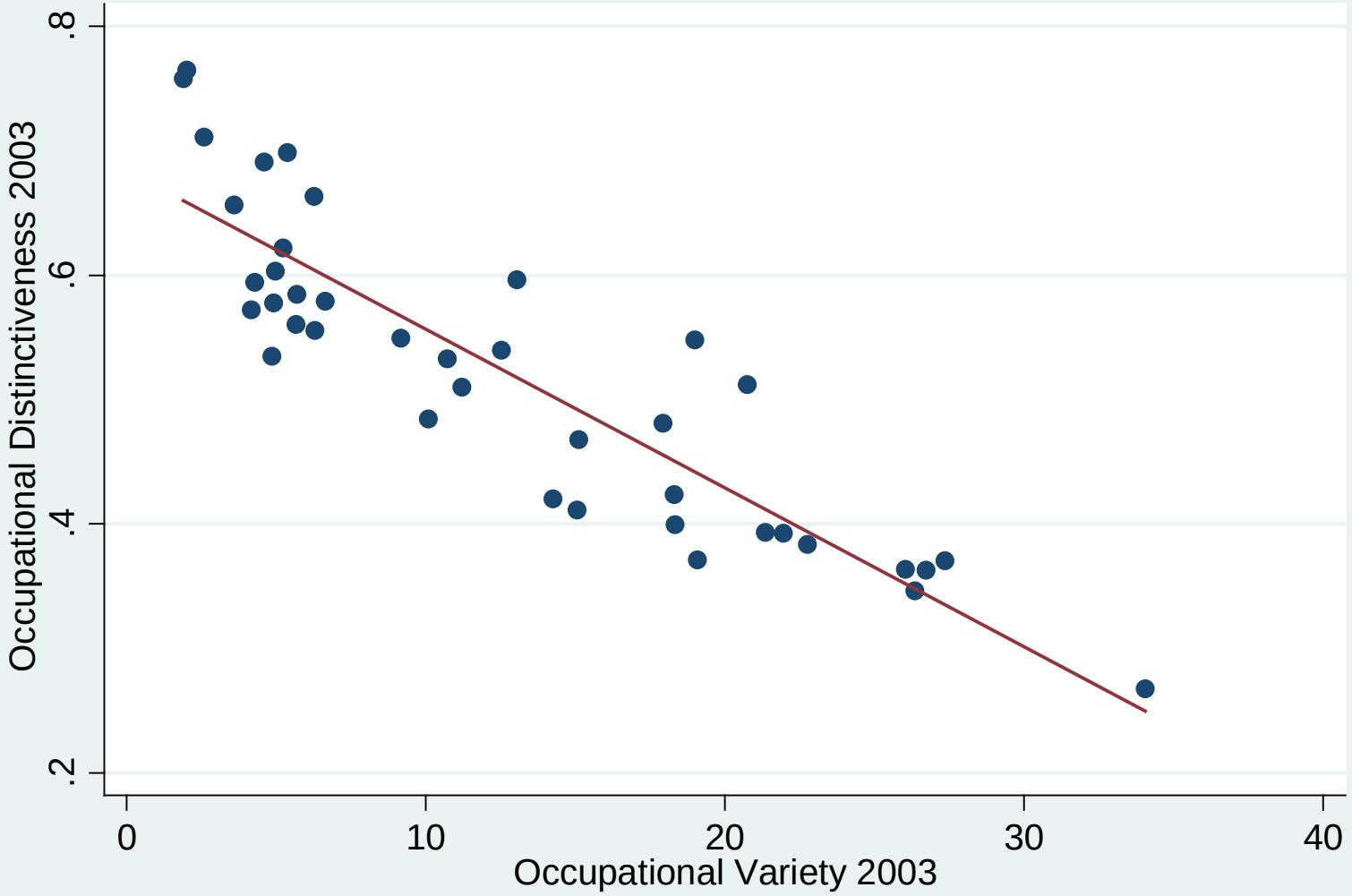


Figure 3: Changes in Occupational Variety by College Majo

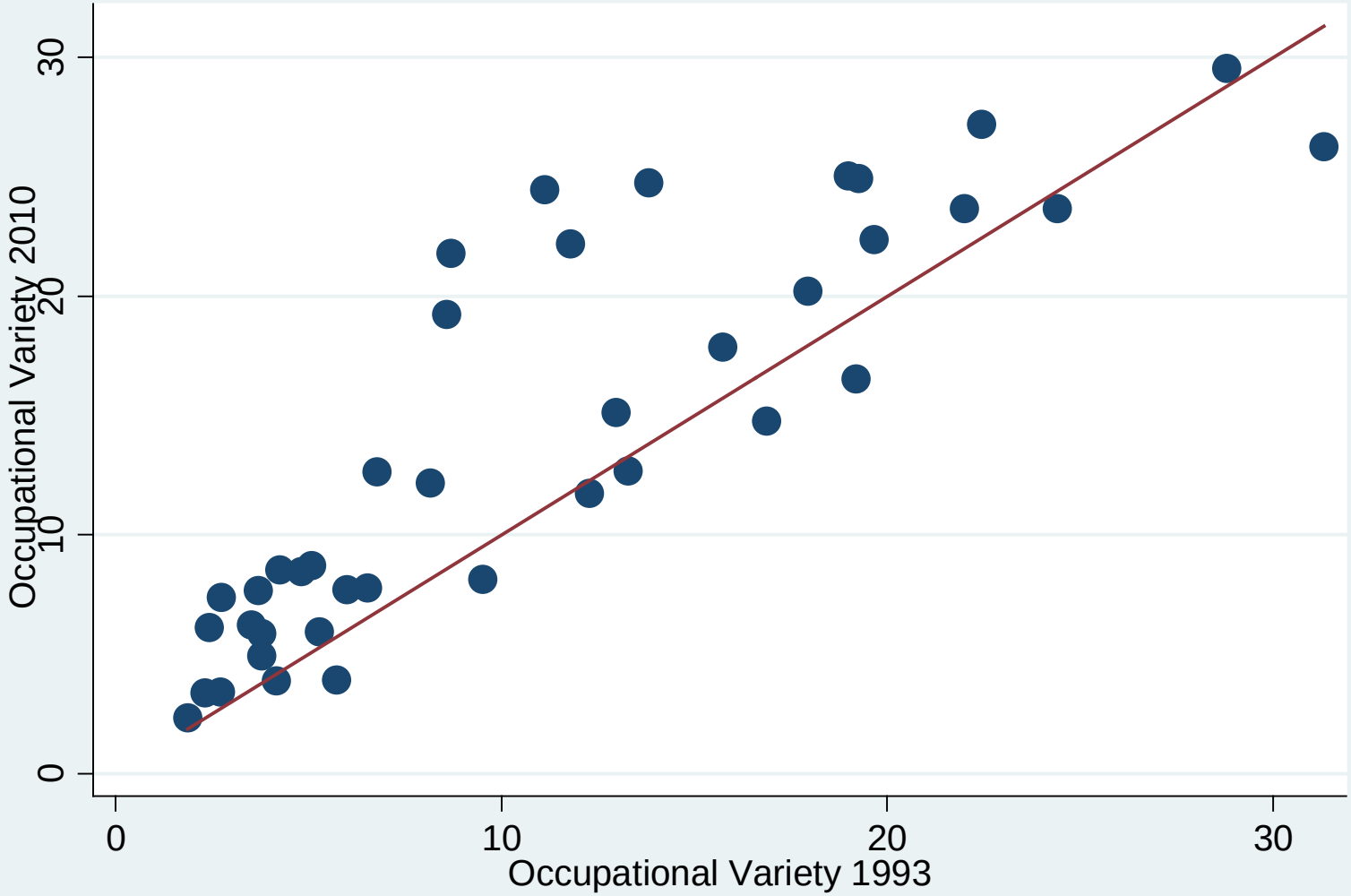
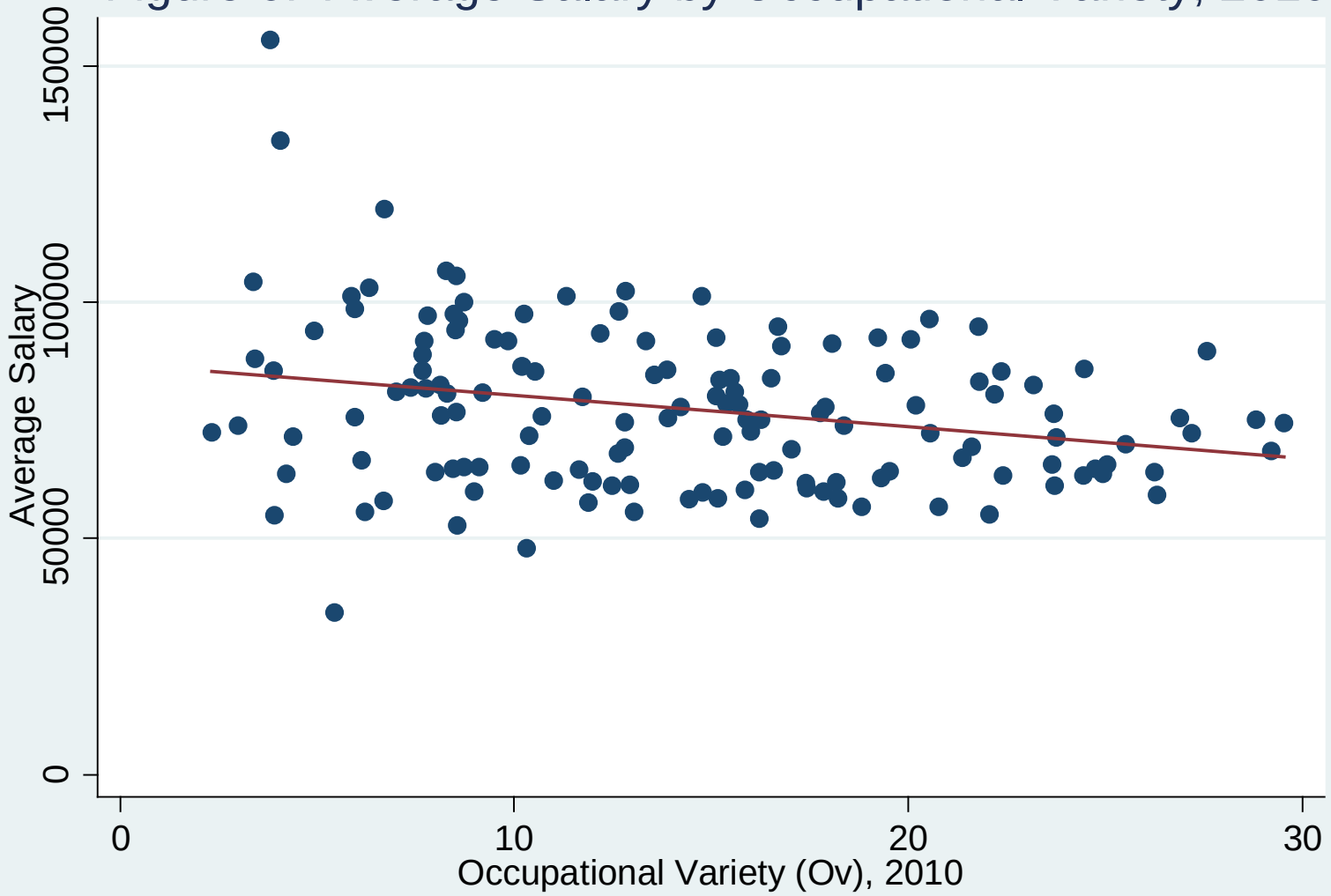


Figure 4: Changes in Occupational Distinctiveness of Majors

Figure 5: Changes in Occupational Variety, 1993-2010 (All majors)

Figure 6: Average Salary by Occupational Variety, 2010



Appendix Table 1
Estimated Values for Occupational Variety
All Majors

	1993			2003			2010		
Major	N	O_v	Std. Error	N	O_v	Std. Error	N	O_v	Std. Error
Accounting	5,163	3.69	0.001	3093	4.86	0.003	642	7.67	0.023
Actuarial Science	28	5.60	0.308	33	4.76	0.253	55	8.29	0.245
Aerospace and related Engineering	866	4.80	0.010	503	5.67	0.023	469	8.46	0.038
Agricultural Economics	309	17.74	0.112	177	17.22	0.146	196	15.59	0.104
Agricultural Engineering	189	12.62	0.108	138	16.14	0.187	152	16.27	0.168
Animal Sciences	514	17.39	0.062	282	23.54	0.137	400	21.60	0.090
Anthropology and Archeology	533	31.30	0.098	413	27.36	0.115	619	26.25	0.076
Applied Mathematics	448	18.70	0.066	479	16.61	0.053	330	20.06	0.097
Architectural Engineering	410	3.65	0.014	152	6.71	0.065	130	9.20	0.099
Architecture and Environmental Design	1,212	2.74	0.003	728	4.27	0.011	695	7.37	0.021
Area and Ethnic Studies	264	28.45	0.156	249	28.17	0.177	499	25.52	0.072
Astronomy and Astrophysics	33	9.99	0.379	34	18.06	0.561	56	17.04	0.452
Atmospheric Sciences and Meteorology	87	5.81	0.136	87	5.12	0.112	146	3.00	0.033
Audiology and Speech Pathology [non-Phd]	442	5.81	0.023	321	6.28	0.040	423	6.69	0.030
Biochemistry and Biophysics	570	8.58	0.032	577	13.06	0.043	621	19.22	0.051
Bioengineering and Biomedical Engineering	68	8.66	0.192	84	13.47	0.255	195	15.50	0.143
Biology, General	4,969	11.11	0.005	3654	12.53	0.008	4017	24.47	0.010
Botany	169	27.02	0.241	146	19.03	0.221	150	15.87	0.214
Business Administration and Management	7,804	12.97	0.003	5336	18.31	0.006	1326	15.12	0.025
Business and Managerial Economics	810	12.36	0.030	463	18.34	0.064	163	15.12	0.142
Business Marketing/ Marketing Management	2,328	12.28	0.008	1495	15.12	0.016	490	11.74	0.042
Business, General	2,000	17.93	0.015	1384	22.76	0.024	528	20.19	0.068
Cell and Molecular Biology	114	11.56	0.151	167	11.19	0.129	226	15.38	0.084
Chemical Engineering	1,833	5.27	0.006	1283	6.30	0.010	1644	5.96	0.007
Chemistry, except Biochemistry	3,728	9.51	0.005	2579	10.73	0.009	2715	8.12	0.007
Civil Engineering	3,230	2.72	0.001	2313	2.60	0.002	2262	3.42	0.002
Clinical Psychology	405	9.39	0.044	376	8.25	0.045	379	13.91	0.062
Communications, General	1,021	17.14	0.029	928	20.16	0.034	379	23.72	0.101
Computer and Information Sciences, Gener	603	6.52	0.014	505	6.26	0.015	585	7.76	0.025
Computer and Systems Engineering	416	5.08	0.021	694	4.59	0.011	658	8.72	0.020

Appendix Table 1 (continued)									
Computer Programming	304	4.65	0.025	231	6.58	0.033	194	8.30	0.078
Computer Science	2,027	5.99	0.003	2298	5.37	0.003	2140	7.71	0.006
Computer Systems Analysis	211	3.96	0.030	103	4.81	0.066	91	7.67	0.128
Computer Teacher Education	18	7.04	0.481	30	8.82	0.270	20	8.00	0.328
Counseling Psychology	377	12.19	0.050	311	11.95	0.071	316	15.16	0.082
Counselor Education and Guidance	79	7.75	0.180	44	8.88	0.364	14	5.44	0.337
Criminal Justice and Protective Services	925	8.68	0.016	601	10.04	0.033	212	12.00	0.107
Criminology	187	9.23	0.083	134	12.59	0.160	204	11.89	0.099
Data Processing Technology	69	5.43	0.106	37	7.73	0.208	22	7.81	0.406
Dramatic Arts	515	16.04	0.063	344	17.89	0.093	81	18.17	0.374
Earth Sciences	119	15.79	0.347	79	17.38	0.314	170	15.29	0.173
Ecology	101	13.09	0.286	150	12.54	0.183	219	10.18	0.098
Economics	2,291	16.88	0.014	1710	21.34	0.019	2675	14.77	0.009
Education Administration	88	6.20	0.145	134	16.24	0.198	33	10.37	0.551
Educational Psychology	207	16.64	0.136	186	20.82	0.165	194	16.22	0.119
Electrical and Electronics Technologies	868	6.37	0.015	353	10.03	0.053	348	10.53	0.048
Electrical, electronics, and communicati	5,981	3.78	0.001	4659	5.23	0.002	4222	5.87	0.003
Elementary Teacher Education	7,629	4.26	0.001	3961	5.68	0.003	773	8.55	0.025
Engineering Sciences, Mechanical and Phy	394	14.87	0.062	221	17.46	0.118	195	20.54	0.170
Engineering, General	320	15.61	0.088	225	22.57	0.152	203	16.70	0.135
English Language, Literature, and Letter	4,980	22.00	0.007	3215	21.97	0.011	783	23.66	0.057
Environmental Engineering	88	4.17	0.084	114	5.25	0.078	121	8.16	0.104
Environmental Science Studies	219	20.30	0.174	246	27.63	0.184	483	22.41	0.087
Experimental Psychology	226	22.82	0.162	186	25.48	0.217	199	23.17	0.207
Financial Management	1,433	8.74	0.010	1070	10.94	0.019	319	9.51	0.060
Fine Arts, All Fields	2,260	16.96	0.017	1229	17.96	0.028	363	22.06	0.105
Food Sciences and Technology	149	8.88	0.116	118	12.11	0.224	154	10.20	0.126
Forestry Services	369	8.62	0.045	279	8.88	0.066	300	9.11	0.055
General Psychology	3,879	19.25	0.009	2811	19.07	0.013	3908	24.94	0.009
Genetics, Animal and Plant	42	12.78	0.373	65	16.31	0.335	74	15.21	0.295
Geography	386	25.02	0.123	339	36.13	0.158	403	29.22	0.153
Geological Sciences, Other	73	6.75	0.194	61	8.84	0.305	95	5.96	0.133
Geology	1,036	4.17	0.008	629	6.65	0.024	778	3.90	0.009
Geophysical Engineering	24	6.00	0.364	50	9.06	0.201	50	10.25	0.289
Health & Medical Assistants [non-Phd]	41	7.21	0.207	223	9.58	0.058	278	12.82	0.078
Health & Medical Technologies [non-Phd]	1,017	2.43	0.003	18	4.76	0.372	45	4.39	0.168

Appendix Table 1 (continued)									
Health Services Administration [non-Phd]	211	7.56	0.056	505	3.59	0.012	415	6.12	0.030
History of Science	49	17.79	0.404	73	22.68	0.376	50	19.53	0.536
History, OTHER	3,450	24.40	0.013	2167	26.37	0.020	633	23.69	0.072
Home Economics	1,733	21.10	0.018	777	25.14	0.054	211	20.78	0.152
Industrial engineering	914	8.14	0.017	693	10.09	0.030	855	12.18	0.026
Industrial Production Technologies	535	17.89	0.059	327	17.04	0.100	298	17.77	0.113
Industrial/Organizational Psychology	182	13.72	0.153	98	22.03	0.304	122	15.70	0.197
Information Services and Systems	322	6.02	0.021	489	7.05	0.018	660	8.54	0.023
International Relations	271	12.93	0.095	264	20.61	0.132	486	18.06	0.061
Journalism	1,076	8.11	0.015	679	13.13	0.042	202	17.41	0.161
Law, Prelaw, Legal Studies	423	7.84	0.038	287	11.98	0.087	165	8.51	0.102
Liberal Arts and General Studies	1,598	28.79	0.028	905	34.05	0.056	583	29.53	0.102
Library Science	87	3.53	0.070	41	3.92	0.170	7	7.00	0.000
Linguistics	200	25.38	0.197	85	24.49	0.310	127	26.31	0.254
Marketing Research	335	14.11	0.064	197	15.14	0.126	37	13.04	0.495
Materials Engineering	157	9.88	0.109	184	10.06	0.123	175	13.88	0.152
Mathematics Teacher Education	525	5.73	0.022	441	4.17	0.018	459	3.92	0.015
Mathematics, General	2,995	19.19	0.009	2065	17.94	0.013	2311	16.52	0.013
Mechanical Engineering	4,583	3.79	0.001	3526	4.96	0.003	3587	4.93	0.003
Mechanical Engineering-Related Technolog	651	6.10	0.019	205	8.92	0.098	195	9.85	0.107
Medical Preparatory Programs [non-Phd]	1,246	1.60	0.001	554	2.05	0.005	300	3.82	0.023
Medicine [non-Phd]	424	2.10	0.006	396	3.06	0.012	281	6.71	0.045
Metallurgical Engineering	258	3.17	0.020	160	3.90	0.043	106	6.32	0.114
Microbiology	578	11.78	0.034	467	18.99	0.058	469	22.20	0.065
Mining and Minerals Engineering	93	6.61	0.119	63	7.07	0.178	48	8.53	0.292
Music, All Fields	1,417	18.37	0.020	839	14.35	0.028	200	14.78	0.165
Naval Architecture and Marine Engineerin	191	8.99	0.076	118	7.03	0.126	89	11.33	0.209
Nuclear Engineering	95	3.77	0.068	75	4.84	0.119	48	8.60	0.354
Nursing [4 Years Or Longer Program; non-	2,628	1.87	0.001	1954	2.01	0.001	2233	2.33	0.001
Nutritional Science	298	4.61	0.028	108	8.90	0.169	170	8.73	0.115
Oceanography	39	15.36	0.525	35	16.33	0.807	40	16.00	0.568
Operations Research	101	12.16	0.188	49	13.88	0.418	58	13.56	0.362
OTHER Agricultural Business and Producti	273	20.57	0.117	246	20.56	0.155	63	11.64	0.316
OTHER Agricultural Sciences	313	20.33	0.126	180	33.33	0.261	182	19.33	0.223

Appendix Table 1 (continued)									
OTHER Biological Sciences	508	14.89	0.064	282	13.82	0.096	332	20.56	0.095
OTHER Business Management/ Administrativ	1,426	16.98	0.023	945	22.08	0.037	340	15.91	0.093
OTHER Communications	866	17.18	0.034	549	19.49	0.060	174	16.58	0.159
OTHER Computer and Information Sciences	66	8.07	0.151	97	12.50	0.173	144	12.94	0.178
OTHER Conservation/ Renewable Natural Re	273	14.84	0.086	2100	13.92	0.014	393	18.22	0.087
OTHER Education	3,183	18.43	0.011	241	21.99	0.159	221	16.79	0.143
OTHER Engineering	423	17.81	0.076	250	23.89	0.139	219	21.81	0.201
OTHER Engineering-Related Technologies	357	18.83	0.104	451	27.50	0.121	152	23.77	0.331
OTHER Fields [Not Listed]	690	23.75	0.062	1278	18.33	0.028	454	27.20	0.097
OTHER Foreign Languages & Literature	1,961	22.44	0.021	448	9.17	0.037	413	12.64	0.060
OTHER Health/ Medical Sciences	606	6.77	0.020	99	13.90	0.229	55	17.90	0.381
OTHER Mathematical Sciences	321	17.81	0.085	185	13.45	0.137	113	11.00	0.161
OTHER Philosophy, Religion, Theology	1,665	10.61	0.015	1053	14.58	0.033	306	24.45	0.147
OTHER Physical and Related Sciences	328	25.25	0.161	155	26.49	0.300	160	28.83	0.321
OTHER Psychology	743	16.25	0.039	318	19.70	0.105	340	26.90	0.117
OTHER Public Affairs	25	12.25	0.396	64	13.84	0.321	38	14.44	0.493
OTHER Social Sciences	945	18.99	0.036	414	26.72	0.111	684	25.04	0.060
OTHER Visual & Performing Arts	637	9.54	0.034	630	9.93	0.037	218	16.22	0.149
Parks, Recreation, Leisure, and Fitness	645	20.58	0.052	371	23.79	0.094	155	18.81	0.217
Petroleum Engineering	209	2.84	0.021	98	3.86	0.069	80	4.08	0.079
Pharmacology, Human and Animal	34	10.51	0.535	49	5.32	0.213	41	12.83	0.319
Pharmacy [non-Phd]	695	2.32	0.005	738	1.91	0.003	410	3.38	0.014
Philosophy of Science	159	25.51	0.226	112	22.40	0.283	80	27.59	0.370
Physical Education & Coaching	1,972	13.56	0.013	1019	12.45	0.025	271	17.43	0.129
Physical Therapy & other rehab [non-Phd]	464	2.58	0.008	403	3.11	0.013	517	4.22	0.015
Physics	1,786	19.67	0.021	1346	20.75	0.025	1276	22.35	0.034
Physiology, Human and Animal	123	9.75	0.172	126	13.83	0.216	150	19.43	0.189
Plant Sciences	393	15.83	0.083	264	17.90	0.152	381	12.82	0.070
Political Science and Government	3,018	13.27	0.009	2240	14.27	0.014	3251	12.66	0.008
Pre-Elementary Teacher Education	344	5.67	0.030	347	6.36	0.030	108	10.32	0.143
Public Administration	209	12.23	0.103	151	14.35	0.186	45	10.71	0.329
Public Health/Env. Health	151	12.92	0.142	144	22.01	0.268	202	18.36	0.161

Appendix Table 1 (continued)									
Public Policy Studies	19	11.65	0.556	38	8.02	0.372	78	13.34	0.320
Science Teacher Education	396	9.99	0.056	311	9.50	0.073	311	8.99	0.068
Science, Unclassified	246	23.42	0.176	55	26.30	0.480	22	14.24	0.604
Secondary Teacher Education	2,499	15.72	0.014	1402	15.05	0.024	516	17.86	0.072
Social Psychology	181	13.31	0.137	144	22.59	0.239	251	21.38	0.133
Social Science Teacher Education	489	12.40	0.045	363	9.38	0.054	335	12.50	0.073
Social Work	1,666	3.51	0.004	929	4.90	0.010	401	6.21	0.032
Sociology	3,396	13.82	0.009	1793	26.05	0.027	2431	24.75	0.017
Special Education	866	3.84	0.008	547	4.28	0.014	161	8.44	0.105
Statistics	158	14.62	0.163	147	14.34	0.117	166	10.21	0.110
Zoology, General	856	8.69	0.023	523	11.21	0.050	460	21.79	0.076

Appendix Table 2
Estimated Values of Occupational Distinctiveness (D)

Major	1993 N	1993 D	1993 St. Error	*2003* N	*2003* D	*2003* St. Error	2010 N	2010 D	2010 St. Error
Accounting	5,163	0.570	0.00002	3093	0.535	0.00002	642	0.475	0.00005
Actuarial Science	28	0.665	0.00013	33	0.694	0.00020	55	0.629	0.00001
Aerospace and related Engineering	866	0.600	0.00004	503	0.560	0.00006	469	0.512	0.00008
Agricultural Economics	309	0.442	0.00006	177	0.521	0.00008	196	0.566	0.00008
Agricultural Engineering	189	0.604	0.00009	138	0.571	0.00010	152	0.508	0.00013
Animal Sciences	514	0.459	0.00005	282	0.467	0.00008	400	0.443	0.00007
Anthropology and Archeology	533	0.349	0.00006	413	0.370	0.00007	619	0.413	0.00007
Applied Mathematics	448	0.509	0.00006	479	0.513	0.00007	330	0.429	0.00008
Architectural Engineering	410	0.698	0.00006	152	0.661	0.00009	130	0.604	0.00009
Architecture and Environmental Design	1,212	0.656	0.00003	728	0.594	0.00005	695	0.516	0.00005
Area and Ethnic Studies	264	0.343	0.00007	249	0.374	0.00009	499	0.462	0.00006
Astronomy and Astrophysics	33	0.784	0.00011	34	0.699	0.00016	56	0.567	0.00019
Atmospheric Sciences and Meteorology	87	0.681	0.00010	87	0.686	0.00011	146	0.705	0.00011
Audiology and Speech Pathology	442	0.577	0.00005	321	0.559	0.00008	423	0.614	0.00008
Biochemistry and Biophysics	570	0.620	0.00005	577	0.596	0.00006	621	0.468	0.00007
Bioengineering and Biomedical Engineering	68	0.685	0.00010	84	0.610	0.00013	195	0.479	0.00012
Biology, General	4,969	0.539	0.00002	3654	0.540	0.00002	4017	0.414	0.00003
Botany	169	0.509	0.00009	146	0.532	0.00012	150	0.561	0.00013
Business Administration and Management	7,804	0.432	0.00001	5336	0.424	0.00002	1326	0.363	0.00004
Business and Managerial Economics	810	0.431	0.00003	463	0.408	0.00005	163	0.516	0.00009
Business Marketing/ Marketing Management	2,328	0.474	0.00002	1495	0.468	0.00003	490	0.424	0.00006
Business, General	2,000	0.387	0.00002	1384	0.384	0.00003	528	0.363	0.00006
Cell and Molecular Biology	114	0.647	0.00010	167	0.649	0.00010	226	0.612	0.00010
Chemical Engineering	1,833	0.590	0.00003	1283	0.556	0.00004	1644	0.541	0.00004
Chemistry, not Biochem	3,728	0.535	0.00002	2579	0.533	0.00003	2715	0.504	0.00003

Appendix Table 2 (continued)

Civil Engineering	3,230	0.702	0.00002	2313	0.711	0.00003	2262	0.661	0.00003
Clinical Psychology	405	0.446	0.00006	376	0.513	0.00008	379	0.448	0.00009
Communications, General	1,021	0.419	0.00003	928	0.373	0.00004	379	0.375	0.00008
Computer and Information Sciences, General	603	0.708	0.00004	505	0.663	0.00006	585	0.526	0.00006
Computer and Systems Engineering	416	0.736	0.00005	694	0.691	0.00004	658	0.551	0.00006
Computer Programming	304	0.690	0.00006	231	0.696	0.00008	194	0.607	0.00011
Computer Science	2,027	0.767	0.00002	2298	0.699	0.00003	2140	0.576	0.00004
Computer Systems Analysis	211	0.735	0.00007	103	0.730	0.00009	91	0.577	0.00015
Computer Teacher Education	18	0.767	0.00000	30	0.739	0.00000	20	0.766	0.00018
Counseling Psychology	377	0.484	0.00006	311	0.486	0.00008	316	0.487	0.00009
Counselor Education and Guidance	79	0.610	0.00009	44	0.694	0.00010	14	0.846	0.00000
Criminal Justice and Protective Services	925	0.513	0.00003	601	0.516	0.00006	212	0.518	0.00009
Criminology	187	0.513	0.00008	134	0.519	0.00010	204	0.531	0.00008
Data Processing Technology	69	0.731	0.00010	37	0.647	0.00012	22	0.708	0.00001
Dramatic Arts	515	0.436	0.00005	344	0.443	0.00007	81	0.567	0.00013
Earth Sciences	119	0.513	0.00011	79	0.627	0.00013	170	0.493	0.00011
Ecology	101	0.546	0.00010	150	0.543	0.00010	219	0.561	0.00011
Economics	2,291	0.403	0.00002	1710	0.393	0.00003	2675	0.451	0.00003
Education Administration	88	0.552	0.00008	134	0.481	0.00010	33	0.644	0.00015
Educational Psychology	207	0.402	0.00008	186	0.474	0.00011	194	0.546	0.00012
Electrical and Electronics Technologies	868	0.623	0.00004	353	0.598	0.00007	348	0.551	0.00009
Electrical, electronics, and communication	5,981	0.668	0.00001	4659	0.622	0.00002	4222	0.576	0.00002
Elementary Teacher Education	7,629	0.597	0.00001	3961	0.585	0.00002	773	0.556	0.00006
Engineering Sciences, Mechanical and Physical	394	0.535	0.00005	221	0.543	0.00007	195	0.430	0.00009
Engineering, General	320	0.479	0.00005	225	0.478	0.00009	203	0.469	0.00009
English Language, Literature, and Letter	4,980	0.367	0.00002	3215	0.393	0.00003	783	0.408	0.00006
Environmental Engineering	88	0.671	0.00010	114	0.656	0.00010	121	0.583	0.00009

Appendix Table 2 (continued)

Environmental Science Studies	219	0.493	0.00007	246	0.491	0.00009	483	0.433	0.00007
Experimental Psychology	226	0.398	0.00006	186	0.398	0.00009	199	0.393	0.00010
Financial Management	1,433	0.494	0.00003	1070	0.450	0.00004	319	0.456	0.00007
Fine Arts, All Fields	2,260	0.426	0.00003	1229	0.443	0.00004	363	0.453	0.00009
Food Sciences and Technology	149	0.532	0.00007	118	0.560	0.00011	154	0.460	0.00010
Forestry Services	369	0.562	0.00006	279	0.617	0.00008	300	0.529	0.00008
General Psychology	3,879	0.333	0.00002	2811	0.371	0.00003	3908	0.404	0.00003
Genetics, Animal and Plant	42	0.724	0.00014	65	0.676	0.00013	74	0.551	0.00016
Geography	386	0.386	0.00005	339	0.365	0.00008	403	0.367	0.00008
Geological Sciences, Other	73	0.697	0.00011	61	0.736	0.00010	95	0.678	0.00014
Geology	1,036	0.614	0.00004	629	0.579	0.00006	778	0.606	0.00006
Geophysical Engineering	24	0.785	0.00000	50	0.791	0.00014	50	0.722	0.00014
Health & Medical Assistants	41	0.765	0.00011	223	0.575	0.00008	278	0.457	0.00007
Health & Medical Technologies	1,017	0.710	0.00004	18	0.859	0.00000	45	0.653	0.00021
Health Services Administration	211	0.532	0.00008	505	0.656	0.00006	415	0.573	0.00008
History of Science	49	0.488	0.00007	73	0.450	0.00016	50	0.542	0.00021
History, Other	3,450	0.318	0.00002	2167	0.346	0.00003	633	0.385	0.00007
Home Economics	1,733	0.437	0.00003	777	0.398	0.00005	211	0.464	0.00011
Industrial engineering	914	0.513	0.00004	693	0.485	0.00005	855	0.466	0.00005
Industrial Production Technologies	535	0.458	0.00004	327	0.452	0.00008	298	0.428	0.00009
Industrial/Organizational Psychology	182	0.458	0.00006	98	0.450	0.00011	122	0.455	0.00012
Information Services and Systems	322	0.721	0.00005	489	0.624	0.00005	660	0.511	0.00006
International Relations	271	0.445	0.00007	264	0.411	0.00008	486	0.453	0.00006
Journalism	1,076	0.463	0.00003	679	0.419	0.00006	202	0.463	0.00011
Law, Prelaw, Legal Studies	423	0.479	0.00006	287	0.456	0.00009	165	0.515	0.00010
Liberal Arts and General Studies	1,598	0.256	0.00003	905	0.268	0.00005	583	0.267	0.00006
Library Science	87	0.699	0.00008	41	0.722	0.00015	7	0.891	0.00000
Linguistics	200	0.425	0.00009	85	0.502	0.00014	127	0.497	0.00015
Marketing Research	335	0.455	0.00004	197	0.485	0.00009	37	0.636	0.00014

Appendix Table 2 (continued)

Materials Engineering	157	0.613	0.00007	184	0.572	0.00009	175	0.490	0.00010
Mathematics Teacher Education	525	0.530	0.00005	441	0.572	0.00007	459	0.663	0.00007
Mathematics, General	2,995	0.477	0.00002	2065	0.481	0.00003	2311	0.449	0.00004
Mechanical Engineering	4,583	0.641	0.00002	3526	0.603	0.00002	3587	0.575	0.00003
Mechanical Engineering-Related Technology	651	0.588	0.00004	205	0.534	0.00009	195	0.542	0.00012
Medical Preparatory Programs	1,246	0.799	0.00003	554	0.741	0.00005	300	0.612	0.00009
Medicine	424	0.787	0.00004	396	0.735	0.00006	281	0.660	0.00009
Metallurgical Engineering	258	0.668	0.00007	160	0.656	0.00009	106	0.599	0.00014
Microbiology	578	0.626	0.00005	467	0.548	0.00007	469	0.476	0.00008
Mining and Minerals Engineering	93	0.681	0.00008	63	0.708	0.00012	48	0.597	0.00020
Music, All Fields	1,417	0.427	0.00003	839	0.495	0.00005	200	0.437	0.00012
Naval Architecture and Marine Engineering	191	0.614	0.00007	118	0.603	0.00012	89	0.588	0.00013
Nuclear Engineering	95	0.712	0.00010	75	0.689	0.00011	48	0.608	0.00021
Nursing (4/4+ years)	2,628	0.780	0.00002	1954	0.765	0.00003	2233	0.712	0.00003
Nutritional Science	298	0.547	0.00006	108	0.507	0.00012	170	0.511	0.00012
Oceanography	39	0.654	0.00009	35	0.577	0.00015	40	0.659	0.00013
Operations Research	101	0.588	0.00010	49	0.583	0.00011	58	0.567	0.00015
Other Agricultural Business and Producti	273	0.477	0.00007	246	0.494	0.00008	63	0.632	0.00011
Other Agricultural Sciences	313	0.513	0.00007	180	0.495	0.00011	182	0.516	0.00012
Other Biological Sciences	508	0.507	0.00005	282	0.575	0.00007	332	0.492	0.00009
Other Business Management/ Administrative	1,426	0.386	0.00002	945	0.389	0.00004	340	0.396	0.00008
Other Communications	866	0.403	0.00004	549	0.404	0.00006	174	0.435	0.00011
Other Computer and Information Sciences	66	0.623	0.00011	97	0.499	0.00009	144	0.501	0.00013
Other Conservation/ Renewable Natural Re	273	0.561	0.00007	2100	0.439	0.00003	393	0.510	0.00008
Other Education	3,183	0.367	0.00002	241	0.475	0.00010	221	0.437	0.00010
Other Engineering	423	0.488	0.00005	250	0.454	0.00007	219	0.416	0.00010
Other Engineering-Related Technologies	357	0.477	0.00006	451	0.338	0.00007	152	0.374	0.00013

Appendix Table 2 (continued)

Other Fields [Not Listed]	690	0.298	0.00005	1278	0.399	0.00004	454	0.411	0.00008

Other Foreign Languages & Literature	1,961	0.342	0.00003	448	0.549	0.00007	413	0.497	0.00008
Other Health/ Medical Sciences	606	0.586	0.00005	99	0.594	0.00012	55	0.526	0.00019
Other Mathematical Sciences	321	0.507	0.00007	185	0.608	0.00010	113	0.627	0.00014
Other Philosophy, Religion, Theology	1,665	0.398	0.00003	1053	0.400	0.00005	306	0.393	0.00009
Other Physical and Related Sciences	328	0.330	0.00007	155	0.364	0.00012	160	0.295	0.00014
Other Psychology	743	0.385	0.00005	318	0.431	0.00008	340	0.389	0.00009
Other Public Affairs	25	0.643	0.00000	64	0.580	0.00016	38	0.646	0.00020
Other Social Sciences	945	0.346	0.00004	414	0.363	0.00006	684	0.411	0.00004
Other Visual & Performing Arts	637	0.509	0.00004	630	0.486	0.00006	218	0.478	0.00011
Parks, Recreation, Leisure, and Fitness	645	0.361	0.00003	371	0.400	0.00007	155	0.462	0.00010
Petroleum Engineering	209	0.714	0.00008	98	0.662	0.00011	80	0.668	0.00014
Pharmacology, Human and Animal	34	0.738	0.00011	49	0.694	0.00014	41	0.620	0.00012
Pharmacy [non-Phd]	695	0.724	0.00004	738	0.758	0.00004	410	0.601	0.00008
Philosophy of Science	159	0.416	0.00009	112	0.456	0.00010	80	0.466	0.00016
Physical Education & Coaching	1,972	0.425	0.00002	1019	0.483	0.00004	271	0.465	0.00009
Physical Therapy & Other rehab [non-Phd]	464	0.646	0.00005	403	0.646	0.00007	517	0.565	0.00007
Physics	1,786	0.526	0.00003	1346	0.512	0.00004	1276	0.416	0.00005
Physiology, Human and Animal	123	0.532	0.00011	126	0.537	0.00011	150	0.497	0.00013
Plant Sciences	393	0.532	0.00006	264	0.542	0.00009	381	0.537	0.00009
Political Science and Government	3,018	0.393	0.00002	2240	0.421	0.00003	3251	0.446	0.00002
Pre-Elementary Teacher Education	344	0.573	0.00006	347	0.619	0.00007	108	0.616	0.00015
Public Administration	209	0.460	0.00006	151	0.459	0.00010	45	0.617	0.00008
Public Health, inc. Environment [non-Phd	151	0.528	0.00009	144	0.429	0.00012	202	0.413	0.00010
Public Policy Studies	19	0.673	0.00000	38	0.648	0.00000	78	0.573	0.00013
Science Teacher Education	396	0.406	0.00006	311	0.459	0.00008	311	0.494	0.00010
Science, Unclassified	246	0.350	0.00008	55	0.470	0.00017	22	0.673	0.00001

Appendix Table 2 (continued)

Secondary Teacher Education	2,499	0.373	0.00003	1402	0.411	0.00004	516	0.479	0.00008
Social Psychology	181	0.470	0.00006	144	0.457	0.00011	251	0.403	0.00007
Social Science Teacher Education	489	0.441	0.00004	363	0.505	0.00007	335	0.573	0.00009
Social Work	1,666	0.580	0.00003	929	0.578	0.00005	401	0.558	0.00008
Sociology	3,396	0.375	0.00002	1793	0.364	0.00004	2431	0.403	0.00002
Special Education	866	0.613	0.00004	547	0.601	0.00006	161	0.597	0.00013
Statistics	158	0.568	0.00009	147	0.608	0.00010	166	0.542	0.00012
Zoology, General	856	0.560	0.00004	523	0.510	0.00007	460	0.400	0.00008