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5 Future Graduate Study and Academic Careers

Jerry R. Green

5.1 Introduction

Demographic and economic forces have conspired to create the potential for a significant gap between the need for faculty in the arts and sciences and the supply of new Ph.D.'s to fill these positions.[1] Many avenues have been discussed through which this shortfall can be accommodated. Among these are increases in student-faculty ratios, decreases in retirements, increases in foreign-trained faculty, decreases in the percentage of high school students continuing to college, and increases in the number of domestically trained Ph.D.'s.

To the extent that the last of these is relied upon, the quality of these future teachers and scholars is equally of concern to the future of higher education, especially over the longer run. Bowen and Schuster (1986), for time periods from the end of World War II to 1985, document the decrease in the frequency of plans to pursue college teaching among several elite groups: Harvard seniors, Rhodes scholars, and members of Phi Beta Kappa. They do not disaggregate across fields of study. Interestingly, their survey evidence does not indicate a reported decrease in the quality of new graduate students and junior faculty, as perceived by existing tenured members of departments and department chairmen. Bowen and Sosa (1989), whose data are broken down by field of study, show that Graduate Record Examination (GRE) test scores for new

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1. Earlier work along these lines includes Radner and Miller (1975), Fernandez (1978), and Bowen and Sosa (1989). Bowen and Sosa disaggregate the supply of new academics by field of study, which is also the principal focus of this paper.

potential faculty members declined precipitously up to 1982 but that verbal scores have recovered since then. The authors go on to examine whether this pattern could have been produced by changes in the frequency of test taking in the population of college seniors rather than by an underlying change in the quality of graduates desiring academic careers.

The present paper is an attempt to detect trends in the quality of people choosing, or potentially choosing, academic careers. The data for this study come from the Harvard Senior Survey, a virtually complete sample of graduating seniors from Harvard and Radcliffe for the years 1985–90.[2] The nature of these data is summarized in section 5.2.

I pay special attention to certain aspects of college graduates' knowledge of their own future plans which I think are very important, both for the population of all graduates and for the Harvard students who are the source of the data in the present study. First, one must recognize that many if not most students are quite uncertain about their own plans. Therefore, their choices about what to do upon graduation will reflect a preference for flexibility and a need for information gathering as well as an expression of unalterable career intent. Second, demand for various postgraduation activities must be in balance with supply. Students who choose to work after graduation, at least in certain jobs and under certain conditions, might not always be able to get what they want. Part of the function of working is often to learn about career possibilities. If the "right" kind of job is not available, students might go directly to graduate school instead. Third, even in a time span as short as the six years of data covered in this paper, there are exogenous forces that impinge differentially on students with various career plans. A stock market crash (1987), a recession (1990), a decline in medical school applications (reasons chronicled elsewhere), and a boom in biotechnology and related fields all are reflected in the immediate postgraduation plans and in longer-term, more indefinitely held plans.

The principal finding in this paper is that, over the period covered by these data, there has been no overall trend in the prevalence of plans to pursue an academic career in the arts and sciences. However, the most recent year, 1990, may be the beginning of a return to academe, although one cannot be sure. Despite the overall absence of a trend, when disaggregated by field of study and academic record, several systematic tendencies do emerge. Humanities concentrators have greatly increased their interest in academic careers, especially those with middle-ranking grade records. In certain scientific specialties there is also an increase, in this case due primarily to the more outstanding students. This paper also attempts to measure the uncertainty students have about their own careers and the way this is expressed in immediate and subsequent postgraduation plans.

2. Older senior surveys are available, but significant variations in the wording of certain questions make comparisons of responses across years more problematic.

Section 5.3 discusses the overall time patterns of career choice and choice of undergraduate concentration. Particular attention is paid to the academic careers and to students who are unsure of their career plans but list "academic" among several possibilities.

Section 5.4 looks at these data in more detail, stratifying by various measures of performance while in college. Section 5.5 is a yet more detailed look, examining trends by fields and relating these changes to the principal alternatives to academic careers for individuals with a given undergraduate concentration. Section 5.6 looks at the paths that individuals plan to take to the goal of an academic career. Some will attend graduate school immediately. Others will work first, or travel, or volunteer. Of these, some plan to take a graduate degree later, continuing to an academic career.

Section 5.7 is a check on the match between the source of these data and the inferences we ask it to provide. We explore whether the Harvard undergraduates are perhaps unrepresentative of the supply of Ph.D. candidates nationally, as captured in the more broadly based Consortium on Financing Higher Education (COFHE) survey.

5.2 Description of the Harvard Senior Survey

The data used in this paper come primarily from the Harvard Senior Survey for the six years 1985–90. (The senior survey questionnaire for 1990 is reproduced as the Appendix to this chapter.) This is an unusually rich source of data for several reasons.

The senior survey is completed by approximately 98 percent of all graduating seniors from Harvard and Radcliffe colleges. The completion rate is so high because one cannot receive commencement tickets without it. Seniors in a given year include all those graduating in that year. Students in earlier entering classes who have taken a leave of absence and are graduating later than most of their classmates are part of the senior survey in the year of their graduation. Correspondingly, members of a given class who have not completed all graduation requirements are not included in the senior survey with their class. Approximately 15 percent of a given cohort do not graduate with their class and are thus not in the population in that year.

Our use of the senior survey is to examine plans and expectations for activities immediately after graduation and beyond, including plans to return to graduate school at a later date. For this purpose, it seems best to focus on cohorts who leave college together, as the senior survey does, rather than on those who entered together. To the extent that postgraduation plans have been affected by events during the college years, graduates from earlier classes will have had a different experience than those who are completing a normal four-year program. Nevertheless, since they will have had time to adjust their plans to the most recent events (e.g., economic conditions), we feel it is best to treat them as the senior survey does and keep contemporaneous graduates, rather than entering classes, together.

Apart from the obvious advantage of having a virtually complete sample, the Harvard Senior Survey has a number of other good qualities as a source of data for the problem we are examining. It is annual, and the questions are quite consistent although not perfectly identical across years. This allows us, first, to have more data and, second, to be able to test for the effects of surprise events that will affect a given class but will not be durable in nature. Most important, we can match individuals' responses in the senior survey to the academic record of the student, to data on their application from high school (including standardized test results), and to their actual career choices as later reflected in reports to the Harvard alumni office.[3]

It must be recognized, however, that data from the Harvard Senior Survey are idiosyncratic to the extent that Harvard students may be atypical. To ascertain the extent of any bias, we compare our results to data from the COFHE 1984 survey.[4] We compare the responses to the COFHE questions asked of Harvard students to responses to similar questions in the Harvard Senior Survey. We also compare responses by Harvard students in the COFHE data to those by students from other colleges and universities. In this way, we hope to learn whether there is any significant response bias in the COFHE sample, which varies in response rate quite widely across institutions, and whether and to what extent Harvard graduates in 1985 are different from those of other institutions in 1984. This is a way of checking our results and provides a better means of extrapolating anything learned from our data to broader populations. Further discussion on this point is deferred to section 5.7.

Our focus will be on the choice of an academic career. In the senior survey, a student can list up to three possible career choices, without indicating a priority or relative likelihood among them. Therefore, it is not always possible to make an unambiguous inference about the choice of an academic career. The strategy we adopt is to create three variables related to the revealed choice of career path. Students are often uncertain about their career plans, and to some extent our approach is intended to reflect their level of uncertainty about their own choice.

Anyone who lists "academe" as one of their first three possible career choices is classified as "yes" for the variable Academic. Among these, if they plan to attend a graduate school in an arts and sciences field within the next 12 months, we classify them as Trueac. Academics who are not Trueacs are of two types. Either they have no plan for graduate school—for example someone who is going to medical school and answers academe as a career

3. I feel this will be a significant advantage as this work is pursued further. Many potential academics, even among those who begin an academic career by going to graduate school, do not have lifetime careers as college teachers and researchers. In the future, we hope to use alumni records to trace the career paths of individuals, determine where the best people are lost to academic careers, and uncover perhaps what can be done to retain them.

4. This is a year of a complete COFHE survey for which a follow-up (1989) is available, which we hope to use in later work.

choice, by which he or she may mean a clinical professorship in a medical school—or else they plan to go to graduate school in an arts and sciences field at a later date.

We also create a third category, one that is a subset of Academic but not of Trueac, which we call Onlyac. These are people who give academe as their only answer to the career choice question. This is an attempt to single out those who have definite academic career plans. The reason that Onlyacs include some non-Trueacs is that there are a number of Academics who are not going to an arts and sciences graduate school immediately. These include some who plan to work immediately, but more important from the point of view of the Onlyac group are those whose postgraduation plans include travel, volunteer work, or government service. This group includes many highly capable individuals who have won fellowships that afford them this "time off" before graduate school; indeed most such fellowships require plans of this sort. Many of these people are motivated toward academic careers.

In section 5.6, we will look in considerable detail at the exact nature of the postgraduation plans of individuals in the Academic, Trueac, and Onlyac groups.

5.3 Time Pattern of Career Choices and Postgraduation Plans

The most striking pattern in all of our results is the surprising constancy of the percentage of respondents who select academic careers. Table 5.1 shows the numbers and percentages of graduates for all career choices, including multiple responses to the career-choice question.[5] The fraction of seniors who are Academics is essentially constant from 1985 to 1989, varying only from a low of 20.1 percent to a high of 23.5 percent in this interval. In 1990, however, there is a jump to 27.3 percent.

Of the most common career choices, medicine and business are quite clearly declining in popularity, while law is increasing. Since at Harvard the training for prelaw and prebusiness is almost indistinguishable (there is no undergraduate business major), it is quite likely that the decline in one is offset by the increase in the other.

The decrease in the number of premed students is more complex and may be more related to changes in the number of academics over the longer run. We will not speculate here on the reasons for the decline in medical careers among Harvard undergraduates. However, our data reveal a number of interesting interactions connected with the training expected of medical school applicants. First, as can be seen in table 5.2, there is a massive decrease in the number of premeds among life science concentrators. In 1985 and 1986 there

5. In survey question V.1 only the first three eventual vocations listed were coded into the database. However, for question V.2, all multiple responses were retained because the priority or importance of different responses could not be determined.

Table 5.1 **Number of Graduates Choosing Career Option**

Option	1985	1986	1987	1988	1989	1990
Academe	327	343	336	320	365	424
Arts	189	162	160	180	170	184
Business	369	361	405	399	364	332
Communications	194	161	186	209	197	214
Design/architecture	38	30	48	43	37	50
Government/politics	213	215	205	239	244	229
Health	36	56	69	59	44	47
Helping professions	62	77	82	89	87	84
Law	238	236	252	320	320	303
Library/museum	15	20	12	13	16	17
Medicine	221	227	221	203	202	215
Religion	37	21	24	28	24	18
Science/technology	106	87	92	98	85	99
Skilled trades/farming	10	11	7	10	16	13
Teaching/administration	43	68	51	61	68	76
Other	27	30	39	38	40	41
Undecided	75	93	93	103	99	106
Number of graduates	1,479	1,457	1,488	1,592	1,608	1,555
Percentage academic	22.1%	23.5%	22.6%	20.1%	22.7%	27.3%
Average number of choices	1.49	1.51	1.53	1.52	1.48	1.58

Note: Students may select all that apply.

Table 5.2 **Number Choosing Career Option: Life Sciences**

Option	1985	1986	1987	1988	1989	1990
Academe	54	58	50	53	55	48
Arts	11	4	5	7	5	3
Business	12	9	25	17	15	8
Communications	2	1	3	7	2	2
Design/architecture	2	0	5	1	0	1
Government/politics	6	4	7	5	9	3
Health	9	17	15	8	5	8
Helping professions	5	4	7	5	3	0
Law	4	3	5	8	9	2
Library/museum	1	1	1	2	1	0
Medicine	135	140	119	122	83	84
Religion	1	0	2	0	2	1
Science/technology	19	9	16	17	12	15
Skilled trades/farming	1	1	0	1	2	1
Teaching/administration	1	3	2	2	5	5
Other	2	3	1	0	2	1
Undecided	2	8	7	8	3	4

Note: Students may select all that apply.

were 135 and 140 premeds in this group, whereas in the two most recent years, 1989 and 1990, these numbers are 83 and 84. In each of the other concentration areas, the number of premeds has actually increased (see tables 5.3, 5.4, and 5.5).

Table 5.3 Number Choosing Career Option: Physical Sciences

Option	1985	1986	1987	1988	1989	1990
Academe	79	59	73	59	81	85
Arts	14	11	5	10	11	23
Business	69	49	48	38	45	23
Communications	7	7	7	12	5	16
Design/architecture	8	2	6	3	1	9
Government/politics	11	9	5	12	6	11
Health	5	1	3	1	2	3
Helping professions	5	9	3	2	0	5
Law	12	10	8	13	8	15
Library/museum	1	1	1	1	0	2
Medicine	23	18	17	18	25	36
Religion	4	1	1	3	2	1
Science/technology	77	66	52	59	55	62
Skilled trades/farming	1	0	1	0	1	2
Teaching/administration	5	6	2	2	3	6
Other	3	2	3	3	2	3
Undecided	12	15	14	12	6	12

Note: Students may select all that apply.

Table 5.4 Number Choosing Career Option: Humanities

Option	1985	1986	1987	1988	1989	1990
Academe	119	146	115	130	144	176
Arts	131	115	117	117	120	118
Business	88	103	113	106	125	109
Communications	133	105	115	117	145	124
Design/architecture	22	21	24	24	28	21
Government/politics	64	84	67	66	96	80
Health	7	24	20	20	18	16
Helping professions	24	31	26	40	35	38
Law	99	118	110	137	153	133
Library/museum	10	12	6	8	13	9
Medicine	37	44	35	32	50	44
Religion	22	18	13	15	15	12
Science/technology	2	5	6	10	9	16
Skilled trades/farming	2	5	6	10	9	16
Teaching/administration	22	48	28	31	40	43
Other	11	10	17	11	12	19
Undecided	38	36	40	46	54	52

Note: Students may select all that apply.

Table 5.5 **Number Choosing Career Option: Social Sciences**

Option	1985	1986	1987	1988	1989	1990
Academe	75	80	94	78	82	115
Arts	32	29	32	46	33	40
Business	200	199	215	236	177	190
Communications	52	46	58	71	43	70
Design/architecture	6	7	13	15	8	19
Government/politics	132	118	122	153	131	134
Health	15	14	31	28	18	20
Helping professions	28	33	43	41	48	41
Law	123	104	127	161	149	152
Library/museum	3	6	4	2	2	6
Medicine	25	25	48	31	50	44
Religion	10	2	8	10	5	4
Science/technology	8	7	7	12	8	6
Skilled trades/farming	3	6	2	2	7	4
Teaching/administration	15	11	17	25	20	22
Other	11	15	17	23	23	18
Undecided	22	34	32	37	36	37

Note: Students may select all that apply.

Admission to medical school is still competitive but is not nearly as difficult as it once was. Medical school applicants at Harvard now may feel that they can select a specialty other than life sciences and still gain admission with a very high probability. Of course, as they do so they may become exposed to ideas and fields of study that they find attractive and may abandon their original medical school aspirations.[6]

Table 5.1 reveals that the mean respondent listed approximately 1.4 career choices in every year. Academics, however, are somewhat more uncertain of their choice, listing on average 1.8 responses, as shown in table 5.6. Breaking this down by field of concentration, we see that the uncertainty is greatest among those in the humanities. In the life sciences, although the average number of careers listed by Academic respondents is above average, this is due primarily to a large number of people who list exactly two responses—academe and medicine. Since for these individuals the actual career to be followed is the same, the issue being only whether one obtains an appointment in a medical school, this probably reflects a lower degree of uncertainty than their average of 1.75 responses per individual would reflect.

My conclusions at this quite aggregated level are the following:

1. The percentage of Harvard graduates contemplating academic careers is

6. It might be possible to test this hypothesis using data from their high school admission records which contain a question on prospective careers and fields of academic concentration, and we hope to do so in future research.

Table 5.6 Number of Vocations Listed by Academics, 1985–1990

	1985	1986	1987	1988	1989	1990
Total						
One	116	116	121	100	160	148
Two	109	126	110	108	109	144
Three	63	51	68	62	59	73
Total	288	293	299	270	328	365
Average	1.82	1.78	1.82	1.86	1.69	1.79
Life sciences						
One	12	18	20	17	23	14
Two	32	35	22	30	23	29
Three	6	5	8	1	6	4
Total	50	58	50	48	52	47
Average	1.88	1.78	1.76	1.67	1.67	1.79
Physical sciences						
One	40	26	34	29	50	41
Two	28	27	22	15	21	30
Three	7	3	12	9	7	4
Total	75	56	68	53	78	75
Average	1.56	1.59	1.68	1.62	1.45	1.51
Humanities						
One	39	49	36	34	53	63
Two	34	35	35	42	42	44
Three	28	30	23	32	27	39
Total	101	114	94	108	122	146
Average	1.89	1.83	1.86	1.98	1.79	1.84
Social sciences						
One	25	23	30	20	33	30
Two	15	29	31	21	22	41
Three	22	13	24	20	18	26
Total	62	65	85	61	73	97
Average	1.95	1.85	1.93	2.00	1.79	1.96

Note: There are only three eventual vocations listed for each student.

constant, except perhaps for 1990. If this most recent year is not an outlier, an increase in the preference for academic careers would reflect a very early sign of a break in a trend of constancy.

2. The most significant change in career plans is a decrease in the number of graduates with plans to pursue medicine.

3. In addition, the number of premeds concentrating in life sciences has decreased. More-varied backgrounds are sought by this group. The number of premeds in non-life-science areas has actually increased. It is possible that some individuals who were premed in their intent before graduation have pursued non-life-science concentrations and are not premed by the end of their

senior year, when they fill out the senior survey. Thus it is possible, but by no means established, that a significant source of academics in arts and sciences, other than life sciences, consists of people who tried a non–life science concentration and liked it so much that it changed their career plans away from medicine and toward an academic career in the discipline to which they were exposed.

5.4 Academic Career Plans and Undergraduate Performance

In this section, we attempt to discover if there is any change over time in the announced decision to follow an academic career as a function of two measures of performance while in college. These measures are grade point average (GPA) and high honors. Harvard uses a somewhat unusual grade point system in which there are one-point gaps between adjacent letter grade categories: A = 15, A− = 14, B+ = 12, B = 11, B− = 10, C+ = 8, C = 7, and so on.

Over the six years of this study, there has been a bit of grade inflation, steadily over time. This somewhat beclouds our results, and we will discuss it further below.

The salient result is that there is no discernible trend in the percentages of high-performance or low-performance individuals to desire an academic career, to pursue an arts and science graduate degree to this end immediately upon graduation, or to list academe as the only career possibility (see tables 5.7 and 5.8). The latest year, 1990, has the highest overall percentage choosing academic careers (23 percent), but this seems equally distributed among all GPA groups. Indeed, although among the very highest group (those with GPAs above 14) the percentage selecting academic careers is 44 percent, this was exceeded in 1987, an otherwise average year for academic careers. Actually it is among those with GPAs between 11 and 13, basically the "straight B" students, that the percentage of Academics has risen the most and is significantly higher than in any other year—22 percent in 1990 as opposed to 18 percent for 1985–89 combined.

Interpretation of these numbers is difficult in the presence of grade inflation. Whether or not students think highly enough of their own academic potential to desire an academic career depends to some extent on their interpretation of their own grades. If students do not know that there is ongoing grade inflation, then as more students get higher grades there is, in effect, more of this positive feedback. Under this hypothesis, conditional on GPA, the progression to an academic career should be constant over time. However, to the extent that students' self-assessments or tastes for academic work are independent of grades received, grade inflation reduces the quality of the pool in any GPA category and should reduce the progression to graduate school in that category. Thus, our observation of roughly constant progression rates could be consistent with an exogenous increase over time in the likelihood that any

Table 5.7 **Types of "Academic Career" Choices by Undergraduate Performance, 1985–1990**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
1985							
11.0 and below	51	11%	10	2%	6	1%	461
11.01–12	54	17	14	4	7	2	324
12.01–13	74	20	21	6	16	4	367
13.01–14	77	31	28	11	29	12	247
14.01 and up	32	40	14	18	9	11	80
Total	201	14	87	6	67	5	1,479
High honors	43	51	21	25	16	19	84
1986							
11.0 and below	36	9	11	3	8	2	407
11.01–12	51	17	14	5	6	2	301
12.01–13	74	19	24	6	17	4	390
13.01–14	92	35	33	12	17	6	265
14.01 and up	40	43	18	19	9	10	94
Total	293	20	100	7	57	4	1,457
High honors	37	45	19	23	11	13	83
1987							
11.0 and below	52	11	32	7	20	4	473
11.01–12	43	14	21	7	11	4	310
12.01–13	73	20	38	10	20	5	373
13.01–14	89	32	57	20	26	9	280
14.01 and up	42	46	27	30	16	18	91
Total	299	20	175	12	93	6	1,488
High honors	55	51	37	35	19	18	107
1988							
11.0 and below	35	8	18	4	7	2	442
11.01–12	42	13	30	9	10	3	336
12.01–13	72	17	41	10	17	4	423
13.01–14	84	29	55	19	33	11	287
14.01 and up	37	36	31	30	19	18	104
Total	270	17	175	11	86	5	1,592
High honors	47	45	38	36	25	24	105
1989							
11.0 and below	43	10	11	3	6	1	414
11.01–12	56	17	11	3	6	2	339
12.01–13	79	19	29	7	19	5	421
13.01–14	99	31	44	14	28	9	320
14.01 and up	51	45	32	28	18	16	114
Total	328	20	127	8	77	5	1,608
High honors	62	54	36	31	20	17	115
1990							
11.0 and below	40	11	4	1	2	1	352
11.01–12	75	21	17	5	9	3	352
12.01–13	93	23	30	8	20	5	398

(*continued*)

Table 5.7 (continued)

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
13.01–14	100	31	41	13	29	9	324
14.01 and up	57	44	29	22	17	13	129
Total	365	23	121	8	77	5	1,555
High honors	53	50	32	30	17	16	107

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

Table 5.8 **Types of "Academic Career" Choices by Undergraduate Performance: Pooled Data**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
11.0 and below	139	10%	53	4%	34	3%	1,341
11.01–12	148	16	49	5	24	3	935
12.01–13	221	20	83	7	53	5	1,130
13.01–14	258	33	118	15	72	9	792
14.01 and up	114	43	59	22	34	13	265
Total	793	18	362	8	217	5	4,424
High honors	135	49	77	28	46	17	274
1988–90							
11.0 and below	118	10	33	3	15	1	1,208
11.01–12	173	17	58	6	25	2	1,027
12.01–13	244	20	100	8	56	5	1,242
13.01–14	283	30	140	15	90	10	931
14.01 and up	145	42	92	27	54	16	347
Total	963	20	423	9	240	5	4,755
High honors	162	50	106	32	62	19	327

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

given individuals would select an academic career, holding constant their assessment of their own potential.[7]

The increasing interest in academic careers among the B students does not

7. To assess this hypothesis and look for a silver lining in terms of extra supply of academics in what would otherwise be a flat picture (with the possible exception of 1990), we looked at GPA rank rather than GPA itself. This procedure is designed to capture the idea that individuals know that there is grade inflation and take account of it in drawing inferences about their own scholarly potential and hence in the interest they take in academic careers. This analysis also shows that there is very little difference between GPA and GPA rank. The relative rank effect, if it is present, is too weak to be captured in our data. Whatever little time trend is revealed by this method is surely most prevalent in the lower portion of the grade distribution, roughly the B or B − range, where academic careers are relatively rare in any event.

persist to their choice to go to graduate school immediately. In 1990 only 7 percent of students with GPAs between 11 and 13 are Trueacs, which is exactly the same as the percentage in 1985–89. Quite possibly this means that these individuals will be planning to work after graduation, to take additional coursework, and to bolster the quality of their application to a graduate school at a later date.

High honors is another measure of performance. I had thought that this would be more indicative of an interest in research, since to graduate with high honors one must write a thesis. The experience of such a major piece of research while an undergraduate may serve to heighten interest in an academic career. However, although the prevalence of Academics among recipients of high honors is much higher than among any other group, even than those with GPAs above 14 (who are about equal in number to the high-honors recipients), there is no discernible trend. Indeed there are some marked curiosities in the time pattern. For example, in 1988, which was in many respects the low point of interest in academic careers (e.g., lowest percentage among those with high GPAs), there was the highest percentage of Onlyac responses. Over half of the high-honors recipients who are Academics are also Onlyacs, whereas in an average year this ratio would be closer to one in three. And for 1990, where there is a heightened interest in academic careers in general and among the B students in particular, there is actually somewhat of a decrease in interest among those earning high honors and a very sharp decrease in the Onlyac category.

5.5 Academic Career Plans and Undergraduate Performance by Field

The results of the previous section might make us a bit pessimistic about finding trends toward academic careers, especially among the higher performance categories of undergraduates. We have seen that 1987, 1988, and 1990 are all somewhat interesting and atypical years, but no consistent pattern is evident. The goal of this section is to examine these trends more carefully, breaking things down by field. We will see here that there are some differences between years that are detectable at the field level and that these differences manifest themselves in different ways from one field to another.

Because of the danger of creating cell sizes that are too small, I pool 1985–87 and 1988–90 to create two subpopulations of approximately equal size. Because the stock market crash of October 1987 would have affected the responses of the classes of 1988 and after, this breakpoint might allow the testing of additional hypotheses in this regard. However, one must be cautious to not overinterpret the data, and I will try hard in this direction although I may not entirely succeed.

The pattern of progression to academic careers is quite different in the four fields of study. Life sciences, as mentioned in section 5.3, have experienced a major decrease in total enrollments—588 degrees conferred in 1985–87 as

compared to 471 in 1988–90. Most of this decrease is attributable to a drop in the number of premeds and a shift in the background of premeds to non-life-science fields. Despite this, the number of Academics coming from the life sciences is roughly constant, and the percentage of graduates who are Academics is necessarily up, as can be seen in table 5.9. More surprising, and more significant for arts and science graduate schools and departments, the number of Trueacs is up, from 44 to 59, and the percentage of Trueacs has almost doubled, from 7 to 13 percent. The situation for Onlyacs is similar—22 from 1985–87 and 28 from 1988–90.

My interpretation of this is as follows: Life science majors are really two groups, premeds and nonpremeds. Interest in medicine may be down, but molecular biology, genetic engineering, and related areas in chemistry and biochemistry are hot topics. These are fields in which jobs are plentiful and relatively well paid. There is a sense of intellectual excitement. But these are jobs for Ph.D.'s with good postdoctoral training. The better undergraduates with these interests are still there. And there may be some additional scientifically talented and well-motivated people who would have been premeds in other times, some who might have chosen computer science or other areas in applied mathematics, and possibly some who might have been in nonscientific concentrations altogether. Although some of the cell sizes are small, there is fairly sound statistical evidence that the constancy of the number of academics and the doubling of the number of Trueacs and Onlyacs is coming at least as

Table 5.9 **Pooled Data on "Academic Career" Choices by GPA: Life Sciences**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
1985–87							
11.0 and below	33	20%	14	9%	9	6	163
11.01–12	21	19	4	4	2	2	111
12.01–13	44	29	11	7	7	5	154
13.01–14	42	36	12	10	3	3	116
14.01 and up	18	41	3	7	1	2	44
Total	158	27	44	7	22	4	588
High honors	18	46	4	10	2	5	39
1988–90							
11.0 and below	16	16	9	9	6	6	99
11.01–12	27	27	12	12	8	8	101
12.01–13	49	38	18	14	7	5	128
13.01–14	39	37	13	12	4	4	105
14.01 and up	16	42	7	18	3	8	38
Total	147	31	59	13	28	6	471
High honors	24	53	10	22	5	11	45

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

much from the elite part of the distribution as it is from the B students. (However, one must also be aware that the average GPA in life sciences is higher than in the college as a whole.)

Physical sciences present a picture similar to that in the life sciences, though trends are somewhat muted. The results are shown in table 5.10. There has been no mass exodus paralleling that of the premed decrease in the life sciences. However, the number of computer sciences concentrators has dropped slightly, and this accounts for most of the 8 percent decrease in the number of physical science concentrators. The number of those with intentions to follow academic careers is about the same. Moreover, as in the case of the life sciences, both the Trueac and the Onlyac categories are up slightly in numbers and therefore up more than slightly as a percentage of concentrators. All three measures of the propensity to follow academic careers show approximately the same distribution across performance categories in the two time periods. The only item of statistical significance is the rise of Onlyacs in the high-GPA categories (13 and up). However, the numbers are relatively small—42 in 1985–87 versus 57 in 1988–90—and I said I would try not to overinterpret them, so I will go no farther here.

Humanities concentrators make up 39.8 percent of respondents in 1988–90, as opposed to 37.2 percent in 1985–87. There is little time pattern in the percentages of Academics in various performance categories. However, the

Table 5.10 **Pooled Data on "Academic Career" Choices by GPA: Physical Sciences**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
1985–87							
11.0 and below	32	15%	15	7%	12	6%	209
11.01–12	28	26	11	10	4	4	108
12.01–13	46	36	29	23	20	16	127
13.01–14	54	47	39	34	26	23	114
14.01 and up	39	62	28	44	16	25	63
Total	199	32	122	20	78	13	621
High honors	51	66	38	49	24	31	77
1988–90							
11.0 and below	19	15	9	7	4	3	127
11.01–12	27	26	10	10	6	6	105
12.01–13	47	35	29	22	19	14	134
13.01–14	72	53	49	36	34	25	136
14.01 and up	41	58	32	45	23	32	71
Total	206	36	129	23	86	15	573
High honors	48	60	40	50	27	34	80

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

number going to graduate school immediately rather than later is up almost 50 percent from 105 to 162, as shown in Table 5.11. This might be due to a decrease in the opportunities to work after graduation. Although the senior survey has a number of questions about the effect of loan balance and other financial measures on choice of work or graduate school (the intent of which is to inquire about the need to earn and save money or reduce indebtedness before going farther in one's education), it does not address the question of the availability of work or of the quality of available work. Whatever the reason for the increased propensity to go to graduate school, the increase seems equally distributed across all GPA categories, except perhaps the lowest, which is in any case only a small contributor to the short-run progression to graduate study.

Social science concentrators have remained at almost exactly the same proportion of seniors in the two subperiods. See table 5.12. It is in the social sciences that the grade inflation is most severe, so some of the results within GPA categories may be a by-product of this phenomenon and do not reflect the progression probabilities for academic careers or graduate school as discussed in section 5.2. The percentage of social science concentrators who are Academics is essentially the same. However, unlike the case of the humanities concentrators, who now seem more likely to go to graduate school directly, social science concentrators have had no significant change in this regard. Of the four fields of specialization, social scientists are the least likely to go to

Table 5.11 **Pooled Data on "Academic Career" Choices by GPA: Humanities**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
1985–87							
11.0 and below	32	8%	11	3%	4	1%	412
11.01–12	60	17	16	4	8	2	363
12.01–13	85	18	28	6	17	4	469
13.01–14	97	31	32	10	24	8	318
14.01 and up	35	41	18	21	12	14	86
Total	309	19	105	6	65	4	1,648
High honors	45	48	24	26	16	17	93
1988–90							
11.0 and below	42	10	8	2	1	0	440
11.01–12	68	17	23	6	6	1	402
12.01–13	96	18	39	7	24	4	537
13.01–14	112	29	55	14	38	10	388
14.01 and up	58	45	37	29	19	15	128
Total	376	20	162	9	88	5	1,895
High honors	60	49	38	31	18	15	122

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

Table 5.12 **Pooled Data on "Academic Career" Choices by GPA: Social Sciences**

	Academic		Trueac		Onlyac		
GPA	N	%	N	%	N	%	Total
1985–87							
11.0 and below	42	8%	13	2%	9	2%	555
11.01–12	38	11	17	5	9	3	347
12.01–13	45	12	14	4	9	2	275
13.01–14	65	27	25	11	9	4	237
14.01 and up	22	31	10	14	5	7	71
Total	212	13	79	5	41	3	1,585
High honors	21	34	11	18	4	7	61
1988–90							
11.0 and below	41	8	7	1	4	1	537
11.01–12	50	12	13	3	5	1	413
12.01–13	50	12	14	3	6	1	432
13.01–14	60	20	23	8	14	5	300
14.01 and up	30	28	16	15	9	8	109
Total	231	13	73	4	38	2	1,791
High honors	30	38	18	23	12	15	78

Note: See section 5.4 for a description of Harvard's grading system and section 5.2 for a description of Academic, Trueac, and Onlyac.

graduate school directly—less than half as likely as in any other field, even adjusted for GPA. I find it quite surprising that the humanities and social sciences are so different in these regards. Both humanities and social sciences are common prelaw concentrations. It would seem therefore that the increase in law as a prospective career should have affected humanities and social sciences similarly, but it did not. This is a trend that should be followed closely in the future.

5.6 Paths to Academic Careers

The prevalence of delaying graduate school plans and the multiplicity of careers contemplated by graduates make an analysis of the paths to academic careers interesting. Figure 5.1 shows alternative paths which could have led to the answer Academic. The choice of what to do immediately upon graduation is shown across the top row. Work is by far the modal option. Only 10 percent of all graduates are going to an arts and sciences graduate school within 12 months. The majority of Academics arrive by different routes. Since the passage to an academic career by any route is uncertain, it is important to know what routes are being chosen.[8]

8. In future work, I hope to examine the attrition rates along various paths. Even for those who go to graduate school directly, the attrition rate is very high. There are many possible slips along

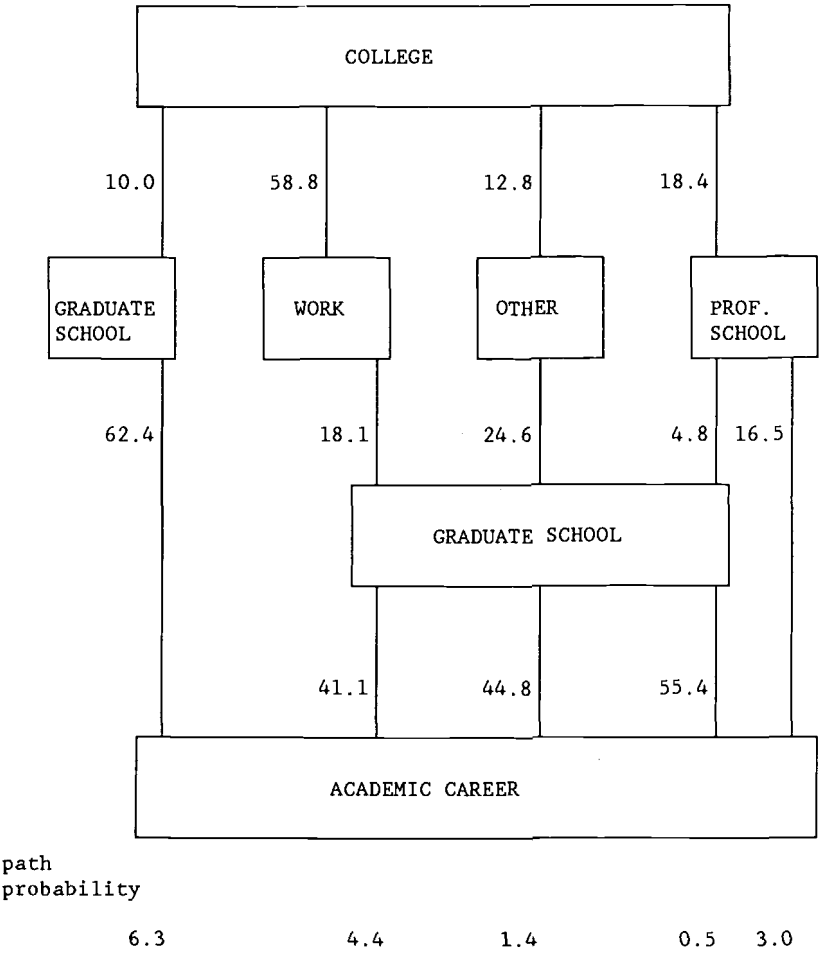


Fig. 5.1 Paths to academic careers, 1985–1990

Note: Percentages shown on each branch of the tree are the conditional probabilities of choosing as indicated. The products of these probabilities down each path of the tree, leading to an academic career, are shown at the bottom.

I assume that in order to be an academic one must have gone to graduate or professional school at some point. Of those not going to graduate school immediately, 16 percent have plans to attend an arts and sciences graduate school eventually. The conditional probabilities of this attendance are shown emanating from the second level of the tree, "Graduate School" (eventually). It is also possible to become an academic following a professional degree, usually

each of the other paths as well. Policies designed to increase the number of qualified faculty members in the future should address each of these leakages. The initial intention to pursue an academic career as expressed by college seniors is not definitive.

law, medicine, or public health. Finally, of those who attain a graduate degree in the arts and sciences or a professional degree, some will have plans to become academics and some will not. The conditional probability of listing an academic career among these possibilities is shown on the next to last line of percentages in the figure.

As these conditional probabilities show, those with plans to attend graduate school immediately are the most likely to go on to an academic career. The differences across groups are, however, smaller than I would have initially thought. Over 40 percent of those deferring graduate school in favor of work are still interested in academic careers. The senior survey does not ask about the highest degree one anticipates receiving. Therefore, it could be that many of those who are working first and returning to graduate school are not in Ph.D. programs. Thus, of those in Ph.D. programs, the commitment for academic careers could be as high among those working initially as it is among those going to graduate school directly.

Individuals who work and then return to graduate school are a significant possible source of future academics. Their numerical significance results from the large number of those who plan to work after graduation. Since only 17 percent of the graduating class states that their decision to work is affected by financial considerations such as a loan balance, I assume that the majority of those who plan graduate school after working are doing so because the work will be beneficial to their careers. It may be a good credential. Or it may allow them to explore the career option they have in mind without having to spend the time in graduate school first. For many, time spent working may simply be time away from school in which they can decide on a career, or on a field of graduate study, as may best suit their interests and personal circumstances.

Those whose plans are listed as "other" are a very interesting group. Some have won fellowships that allow, or require, travel or public service. These tend to be very highly selective awards, and the students in this category have much better than average performance. Their average GPA is 12.16, and 13.0 percent of them have degrees with high honors, in contrast to samplewide averages of 11.86 and 6.6 percent. Not surprisingly, many of them want to return to graduate school and have the intent to follow academic careers. Indeed they are more than twice as likely to go to graduate school than the sample as a whole.

Finally, there is the relatively small group who plan to go to an arts and sciences graduate school after a professional school. These can be people in certain joint degree programs (e.g., M.D./Ph.D.). Most of them have academic plans, though it is difficult to say for certain that they are a potential source of arts and sciences faculty.

By multiplying the conditional probabilities down each path in the tree, we can see the sources of academics as a percentage of all graduates. This is shown in the last line of figure 5.1.

Figures 5.2 and 5.3 show the same conditional probabilities displayed as

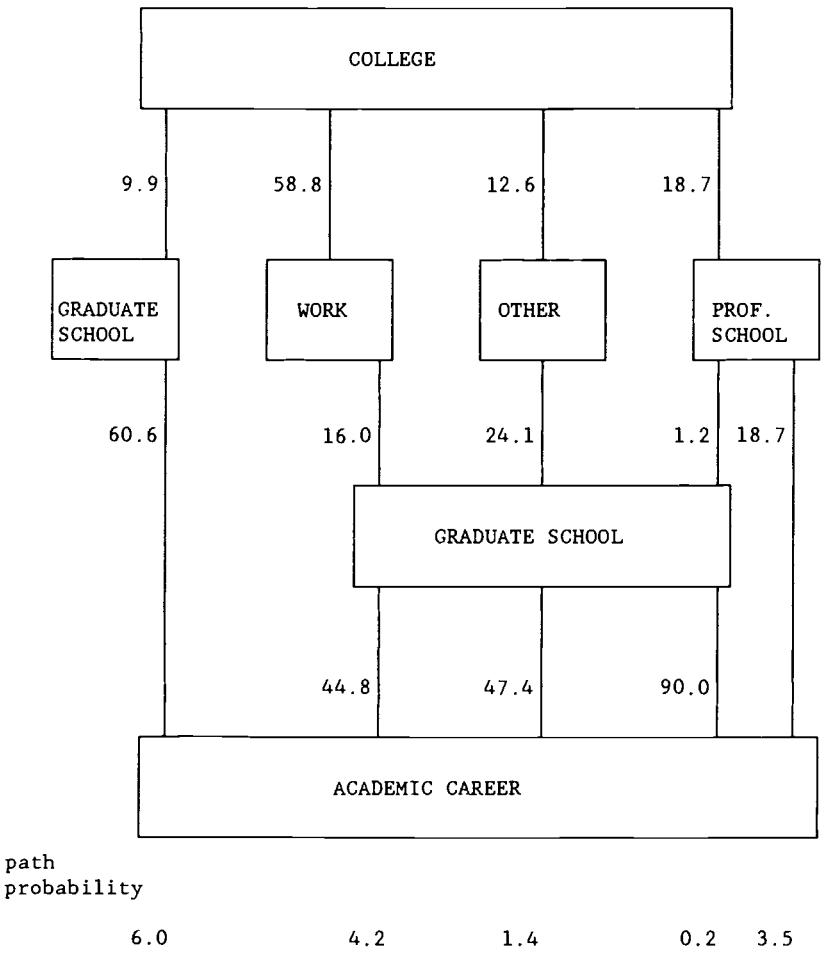


Fig. 5.2 Paths to academic careers, 1985–1987

Note: Percentages shown on each branch of the tree are the conditional probabilities of choosing as indicated. The products of these probabilities down each path of the tree, leading to an academic career, are shown at the bottom.

trees for the two subperiods. The differences are not significant. Indeed the initial choice upon graduation is almost exactly the same. A slight increase in the probability of returning to graduate school after working is offset by a decrease in the probability of becoming an academic after this sequence. As a percentage of all graduates, the probability of this route rises from 4.2 percent to 4.5 percent, which is insignificant by any measure.

In order to see if the behavior or anticipated behavior of different groups might be changing, we break the population down by performance. Again in order not to create too many small cells, we take a simple division into GPAs

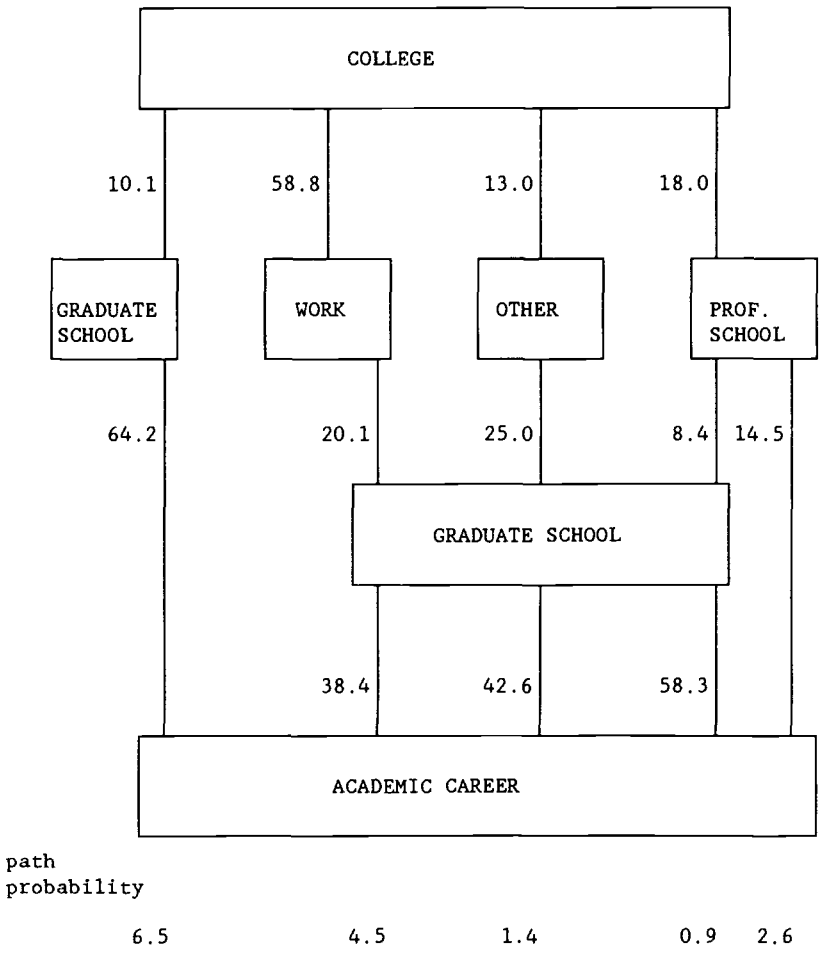


Fig. 5.3 Paths to academic careers, 1988–1990

Note: Percentages shown on each branch of the tree are the conditional probabilities of choosing as indicated. The products of these probabilities down each path of the tree, leading to an academic career, are shown at the bottom.

above 13 (high GPA) and those below 13 (low GPA).[9] The results are shown in tables 5.13 and 5.14. It is not a surprise that those with high GPAs are more likely to go to graduate school immediately and more likely to plan to return to graduate school following work. It is a bit more of a surprise, but not markedly so, that they are more likely to plan an academic career after completing

9. Recall that in the Harvard system, 13 does not correspond to any letter grade. It is in the gap between A− and B+. Roughly, a student with a GPA of 13 has as many A's as B's and nothing worse than B. About a quarter of all students are above this cutoff.

Table 5.13 **Paths to Academic Choice: GPA 13.00 and above**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 1,102										
Plans	201	18%	470	43%	129	12%	302	27%	83	28%
Plans for grad. school	201	100	116	25	49	38	4	1		
Conditional probability of Academic	144	72	66	57	30	61	4	100		
Academic		13		6		3		0		
Onlyac	82	57	12	18	3	10	2	50		
1988–90: Total = 1,312										
Plans	260	20%	545	42%	175	13%	332	25%	66	22%
Plans for grad. school	260	100	151	28	57	33	37	11		
Conditional probability of Academic	186	72	79	52	26	46	21	57		
Academic		14		6		2		2		
Onlyac	122	66	12	15	5	19	6	29		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

Table 5.14 **Paths to Academic Choice: GPA under 13.00**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 3,361										
Plans	243	7%	2,152	64%	432	13%	534	16%	73	14%
Plans for grad. school	243	100	315	15	89	21	6	1		
Conditional probability of Academic	125	51	122	39	34	38	5	83		
Academic		4		4		1		0		
Onlyac	78	62	19	16	8	24	3	60		
1988–90: Total = 3,443										
Plans	220	6	2,252	65	445	13	526	15	58	12
Plans for grad. school	220	100	411	18	98	22	35	7		
Conditional probability of Academic	122	55	137	33	40	41	21	60		
Academic		4		4		1		1		
Onlyac	71	58	14	10	3	8	7	33		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

graduate school in an arts and sciences field. This may, however, be a statistical artifact of the fact that we cannot distinguish between plans to get master's degrees in arts and sciences fields as opposed to doctorates.

Finally, of those going down each branch of the tree, we show the number and percentage of Onlyacs—that is, those who list no occupation other than "academe." The percentage of Onlyacs among the high-GPA group is marginally greater than among the low-GPA group. This probably reflects a level of self-assuredness that a strong academic record engenders. The significance is, however, slight.

Comparing these transition probabilities across time periods reveals little change at all. Therefore, we examine the data by field, paralleling in tables 5.15–5.18 the analysis in section 5.5.

Life science concentrators have, as might be expected, increased their probability of going to graduate school immediately. There is a slight decrease in the probability of choosing an academic career given this initial decision. This is probably due to the excellent research opportunities in biotechnology firms for Ph.D.-level scientists in the life sciences. Otherwise, the analysis of postgraduation plans over time is unremarkable in the life sciences.[10]

For the other three groups of concentrations, no significant pattern is detected over time in any of the conditional probabilities. Thus, I conclude three things:

1. In certain very specific specialities, such as molecular biology, there may be very marked changes in the probability of progression to graduate school and an academic career and in the quality of students making this choice. These changes are masked when one looks at broader categories of undergraduates, such as all life science concentrators.

2. There is some evidence that quality in the social sciences and humanities may be decreasing, while quality in the sciences may be increasing.

3. It is possible that 1990 is the start of a different trend, perhaps due to the current recession. The data do not allow us to say this definitely, but the possibility should be followed closely this year and thereafter.

5.7 Comparison of the Harvard and COFHE Data

In this section, we compare the data from the Harvard Senior Survey of 1985, analyzed above, to the data from the COFHE survey of 1984. We also compare the subset of the COFHE survey that came from Harvard students with two other subsets of COFHE respondents: other universities and coeducational colleges. We restricted attention to institutions where the response

10. Fifteen students in the later time period report a plan to go to graduate school following professional school, as compared to zero in the earlier period. However, there is a corresponding decrease in the number planning an academic career after professional school alone. This is more likely to reflect a change in the degree qualifications for certain research and clinical positions in medical schools than to denote any real change in academic career plans.

Table 5.15 **Paths to Academic Choice, by Field: Life Sciences**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 588										
Plans	52	9%	203	35%	42	7%	291	49%	70	24%
Plans for grad. school	52	100	31	15	8	19	0	0		
Conditional probability of Academic	35	67	19	61	5	63	0	0		
Academic		6		3		1		0		
Onlyac	16	46	3	16	3	60	0	0		
1988–90: Total = 471										
Plans	58	12	158	34	39	8	216	46	42	21
Plans for grad. school	58	100	34	22	9	23	15	7		
Conditional probability of Academic	45	78	18	53	7	78	12	80		
Academic		10		4		1		3		
Onlyac	23	51	0	0	2	29	3	25		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

Table 5.16 **Paths to Academic Choice, by Field: Physical Sciences**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 621										
Plans	155	25%	355	57%	44	7%	67	11%	25	38%
Plans for grad. school	155	100	117	33	12	27	1	1		
Conditional probability of Academic	108	70	43	37	3	25	1	100		
Academic		17		7		0		0		
Onlyac	71	66	5	12	1	33	1	100		
1988–90: Total = 573										
Plans	149	26	284	50	49	9	91	16	66	84
Plans for grad. school	149	100	97	34	23	47	12	13		
Conditional probability of Academic	111	74	39	40	12	52	7	58		
Academic		19		7		2		1		
Onlyac	77	69	6	15	0	0	3	43		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

Table 5.17 **Paths to Academic Choice, by Field: Humanities**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 1,648										
Plans	151	9%	970	59%	284	17%	243	15%	30	13%
Plans for grad. school	151	100	183	19	88	31	7	3		
Conditional probability of Academic	80	53	74	40	39	44	6	86		
Academic		5		4		2		0		
Onlyac	50	63	9	12	3	8	3	50		
1988–90: Total = 1,895										
Plans	171	9	1,141	60	303	16	280	15	39	16
Plans for grad. school	171	100	275	24	81	27	34	12		
Conditional probability of Academic	103	60	100	36	28	35	17	50		
Academic		5		5		1		1		
Onlyac	64	62	16	16	2	7	6	35		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

Table 5.18 **Paths to Academic Choice, by Field: Social Sciences**

	Graduate School		Work		Other		Professional School		Professional Academic*	
	N	%	N	%	N	%	N	%	N	%
1985–87: Total = 1,585										
Plans	82	5%	1,081	68%	188	12%	234	15%	31	13%
Plans for grad. school	82	100	95	9	30	16	2	1		
Conditional probability of Academic	45	55	51	54	17	57	2	100		
Academic		3		3		1		0		
Onlyac	23	51	13	25	4	24	1	50		
1988–90: Total = 1,791										
Plans	102	6	1,198	67	226	13	265	15	30	12
Plans for grad. school	102	100	152	13	41	18	11	4		
Conditional probability of Academic	49	48	57	38	18	44	6	55		
Academic		3		3		1		0		
Onlyac	29	59	4	7	4	22	1	17		

Definitions of parameters:

Plans = Number and percentage making indicated choice

Plans for grad. school = Number and percentage planning graduate school, given an initial choice of work, other, or professional school

Conditional probability of academic = Number and percentage indicating "academic" as a percentage of those planning graduate school in the given path

Academic % = Number of Academics ÷ Total

Onlyac: N = Number of Onlyacs

% = Number of Onlyacs ÷ Number of Academics

*Graduates planning to follow an academic career in a professional school (e.g., teach in a medical school).

Table 5.19 **Undergraduate Field of Study: COFHE Data 1984, Harvard Senior Survey 1985 (percentages)**

	COFHE Harvard	COFHE Colleges	COFHE Universities	Senior Survey
Life sciences	18.1%	9.6%	8.8%	13.2%
Physical sciences	11.5	15.5	17.0	16.4
Humanities	19.6	29.1	28.8	36.2
Social sciences	35.0	27.4	28.6	34.1
Other	27.7	20.7	16.8	0.1
Total number included	260	1,665	2,119	1,479

Table 5.20 **Comparison of Questions Related to Progression to an Arts and Sciences Graduate School (percentage)**

	COFHE Harvard	COFHE Colleges	COFHE Universities	Senior Survey
Life sciences	27.0%	13.1%	15.0%	12.6%
Physical sciences	33.3	27.1	24.4	24.0
Humanities	9.8	8.7	11.7	9.7
Social sciences	17.6	9.0	7.3	7.1
Other	11.1	8.4	7.6	—

rate was over 50 percent, as it was for Harvard. We also eliminated MIT from the sample, due to the special nature of the undergraduate program there.

Table 5.19 shows the comparison of the fields of study of the students in the three subsamples of COFHE respondents and in the Harvard Senior Survey. We can see that a large number of Harvard students are classified as in "other" fields by COFHE (27.7 percent), whereas our fields have been constructed so that there are essentially no Harvard concentrations outside the life science/physical science/humanities/social science groupings. This should be kept in mind in interpreting the progression plans reported by COFHE respondents in each field. Across the three COFHE subsamples, we can see that Harvard is not markedly atypical. The principal differences are that Harvard has a somewhat larger percentage of life science and social science concentrators. This is probably due to a higher percentage of prelaw and premed students than at other COFHE institutions.

The COFHE survey has a general question about intentions to attend graduate school in the arts and sciences. The most similar question in the senior survey asks whether one expects to go to an *arts and sciences* graduate school immediately. The comparison is shown in table 5.20.

Table 5.20 reveals that the Harvard students are more likely to go to graduate school in each field, though the difference is slight in the humanities.

Comparing Harvard students who replied to the COFHE survey and the complete sample in the senior survey is interesting. We expect a lower rate of positive answers to the question about progression to graduate school immediately in the senior survey, and this is the case except for humanities concentrators, where the percentages are virtually the same. This similarity could be due to the fact that there is no sample selection bias for humanities students (i.e., humanities students who returned the COFHE survey are not any different than the population as a whole), whereas in the other fields those who returned the COFHE survey may have been the more "academic" types. It is not due to a difference in the questions about plans to go to graduate school immediately rather than on a delayed basis, as can be seen by comparing table 5.17 (humanities) with tables 5.15, 5.16, and 5.18. Future academics in the humanities are at least as likely to delay graduate school for work or another activity as are the rest of Harvard undergraduates.

For those students who respond positively to the question about attending an arts and sciences graduate program, the COFHE survey asks about the highest degree expected. This is a good proxy for the intention to continue to an academic career. The responses are shown in table 5.21.

We can see that given attendance at graduate school, Harvard students are more likely to expect to attain a Ph.D. However, except in the physical sciences this is not a very pronounced difference. The disparity in the physical sciences may be due to the fact that Harvard has very few engineering concentrators (which is why we deleted MIT from the COFHE sample of universities). Engineers who can get very good jobs at the top of their professions without a Ph.D. are probably less likely than other physical scientists to pursue that course. Therefore, the difference between Harvard students and the other COFHE respondents, although positive, is probably slight and not related to field of study.

Based on this comparison of data sources I conclude that the Harvard Senior Survey is probably a good indicator of trends for a wider group of institutions and that the sample selectivity in the COFHE data, due to the nonmandatory responses at most institutions, is not likely to be a very important problem for the study of the progression to graduate school and academic careers.

Table 5.21 **Final Degree Expected by COFHE respondents: Ph.D. (percentage)**

	COFHE Harvard	COFHE Colleges	COFHE Universities
Life sciences	29.8%	28.1%	26.2%
Physical sciences	43.3	34.5	31.4
Humanities	29.4	21.7	23.5
Social sciences	20.9	20.2	13.9
Other	22.2	18.8	17.7

Appendix

ANNUAL SENIOR SURVEY
1990

PAGE 1–QUESTIONS

Name _____ Local Phone Number _____ House Affiliation _____

Permanent Home Address _____ Concentration _____

City _____ State _____ Zip Code _____

II LEAVE OF ABSENCE + SUMMERS

1. DID YOU WITHDRAW OR TAKE A LEAVE OF ABSENCE AS AN UNDERGRADUATE? 1. Yes 2. No
2. IF YES, INDICATE LAST SEMESTER COMPLETED, PRIOR TO FIRST LEAVE. 1. Fresh. Fall 3. Soph. Fall 5. Jr. Fall 7. Sr. Fall 2. Fresh. Spring 4. Soph. Spring 6. Jr. Spring
3. HOW LONG WAS YOUR FIRST LEAVE? 1. One Sem. 2. Two Sems. 3. Three Sems. 4. Four Sems. 5. Five Sems. 6. Six or more
4. WHERE DID YOU SPEND YOUR FIRST LEAVE? 1. U.S. 2. Abroad 3. Both
5. WHAT WAS YOUR PRIMARY ACTIVITY DURING YOUR FIRST LEAVE? 1. Employment 2. Study 3. Voluntary Service 4. Travel 5. Thesis Research 6. Other, Please Explain: _____
6. HOW MANY COLLEGE SUMMERS HAVE YOU SPENT ABROAD? 1. One 2. Two 3. Three 4. None
7. WHAT WAS YOUR PRIMARY ACTIVITY DURING EACH SUMMER ABROAD?
   First Summer: 1. Employment 2. Study 3. Volunteer Service 4. Travel 5. Thesis Research
   Second Summer: 1. Employment 2. Study 3. Volunteer Service 4. Travel 5. Thesis Research
   Third Summer: 1. Employment 2. Study 3. Volunteer Service 4. Travel 5. Thesis Research
8. IN WHICH COUNTRIES HAVE YOU WORKED, STUDIED, OR SERVED AS A VOLUNTEER? _____

III PUBLIC SERVICE

1. DID YOU GIVE TIME TO PUBLIC SERVICE? 1. Yes 2. No
2. WHAT WAS THE NATURE OF YOUR ACTIVITY? CHECK ANY THAT APPLY.
   1. Education 3. Government 5. Mental Health 7. Social Service
   2. Environmental Affairs 4. Health Care/Public Health 6. Politics 8. Other _____
3. WHAT WAS YOUR COMMITMENT? 1. Full-Time 2. Part-Time 3. Both
4. WHEN DID YOU PARTICIPATE? 1. Term-Time 2. Summer 3. Leave 4. Two or more
5. WHAT WAS THE TYPE OF SERVICE? 1. Paid 2. Volunteer 3. Both

IV GRADUATE STUDY + EMPLOYMENT PLANS

1. WHAT DO YOU PLAN AS YOUR MAJOR ACTIVITY DURING THE NEXT 12 MONTHS? (EXCLUSIVE OF SUMMER PLANS) Choose one.
   1. Paid Employment in U.S. 5. Voluntary Services in U.S. 9. Other in U.S. _____
   2. Paid Employment Abroad 6. Voluntary Services Abroad 10. Other Abroad _____
   3. Graduate Study in U.S. 7. Travel in U.S.
   4. Graduate Study Abroad 8. Travel Abroad
2. IF ABROAD, IN WHICH COUNTRIES WILL YOU BE? _____
3. SUMMER PLANS; IF DIFFERENT FROM ABOVE (USE SAME CODES AS PREVIOUS QUESTION)
   1 2 3 4 5 6 7 8 9 10. Other Please Explain: _____
4. ARE YOU PLANNING TO ATTEND GRADUATE SCHOOL IN THE NEXT 12 MONTHS OR EVENTUALLY? 1. Yes, Definitely 2. Probably 3. Uncertain 4. No
5. IF YOU PLAN TO ATTEND GRADUATE SCHOOL IN THE NEXT 12 MONTHS, WHAT FIELD OF STUDY?

1. Arts - Studio and Performing	6. Business	12. Law
Arts and Sciences:	7. Communications	13. Medicine
2. Humanities	8. Design/Architecture	14. Other Health,
3. Social Sciences	9. Divinity/Religion	Field _____
4. Life Sciences	10. Education	15. Public Policy
5. Math and Physical Sciences	11. Joint Degree _____	16. Other _____

6. IF YOU PLAN TO ATTEND GRADUATE SCHOOL EVENTUALLY OR IN A SECOND GRADUATE PROGRAM, WHAT FIELD OF STUDY?

1. Arts - Studio and Performing	6. Business	12. Law
Arts and Sciences:	7. Communications	13. Medicine
2. Humanities	8. Design/Architecture	14. Other Health,
3. Social Sciences	9. Divinity/Religion	Field _____
4. Life Sciences	10. Education	15. Public Policy
5. Math and Physical Sciences	11. Joint Degree _____	16. Other _____

PLEASE FLIP QUESTIONNAIRE OVER TO PAGE 2

PAGE 2–QUESTIONS

IV GRADUATE STUDY + EMPLOYMENT PLANS (continued)

7. IF YOU PLAN FULL-TIME EMPLOYMENT DURING THE NEXT 12 MONTHS, WHAT TYPE OF JOB:
   1. Arts – studio, performing, writing
   2. Business
   3. Communications – film, media, advertising, journalism
   4. Government/Politics – public interest
   5. Military/Police
   6. Research – social science, humanities, museum
   7. Science/Technology
   8. Skilled Trades/Farming
   9. Social Services – mental health, public health
   10. Teaching – administration (non-college)
   11. University/College – administration, library, clerical
   12. Other _____
   13. Undecided
8. HAVE YOU ACCEPTED A JOB? 1. Yes 2. No Please Specify _____
9. IF YOU SECURED A FULL-TIME JOB FOR THE NEXT YEAR, HOW DID YOU LEARN ABOUT THIS JOB? (CHOOSE ANY THAT APPLY)
   1. Through OCS
   2. Through Tutors, Professors
   3. Through Family or Friends
   4. Through Empl. Agencies or Ads
   5. Through Unsolicited Inquiries
   6. Other _____
10. HAS YOUR EDUCATIONAL LOAN INDEBTEDNESS AFFECTED YOUR CHOICE OF EMPLOYMENT? 1. Yes 2. No
11. YOUR CHOICE OF GRADUATE STUDY? 1. Yes 2. No
12. THE TIMING OF GRADUATE STUDY? 1. Yes 2. No EXPLAIN: _____

V EVENTUAL VOCATION

1. WHAT EVENTUAL VOCATION DO YOU PLAN ON? IF YOU HAVE SEVERAL PLEASE LIST THEM.
   _____
   _____
2. WHICH OF THE FOLLOWING CATEGORIES BEST CHARACTERIZE THE KIND OF CAREER YOU HAVE IN MIND? (CHOOSE ANY THAT APPLY)
   1. Academe – teaching, research, administration
   2. Arts – studio, performing, writing
   3. Business
   4. Communications – media, film, advertising, journalism
   5. Design/Architecture
   6. Government/Politics
   7. Health, other than medicine
   8. Helping Professions
   9. Law
   10. Library/Museum
   11. Medicine
   12. Religion
   13. Science/Technology (non-academic)
   14. Skilled Trades/Farming
   15. Teaching–administration (non-college)
   16. Other _____
   17. Undecided

VI EVALUATION

1. OCCASIONALLY WE RECEIVE REQUESTS FROM STUDENTS FOR NAMES OF ALUMNI(AE) ATTENDING CERTAIN GRADUATE PROGRAMS OR DOING SPECIFIC KINDS OF WORK. WILL YOU ALLOW US TO MENTION YOUR NAME TO THESE STUDENTS? 1. Yes 2. No
2. PLEASE HELP US EVALUATE THE OFFICE OF CAREER SERVICES (IN SUCH AREAS AS COUNSELING, LIBRARY, INTERVIEW TRAINING, FELLOWSHIPS, ON-CAMPUS RECRUITING, PUBLIC SERVICE, WORK AND STUDY ABROAD.)
   _____
   _____
   _____
   _____
   _____
3. HOW MANY VISITS TO THE OFFICE OF CAREER SERVICES DID YOU MAKE? 1. 1 to 5 2. 6 to 9 3. 10 or More 4. None
4. PLEASE COMMENT ON THE JOB AND GRADUATE SCHOOL COUNSELING YOU RECEIVED ELSEWHERE AT HARVARD. _____
   _____

VII GRADUATE SCHOOL EXAMINATIONS

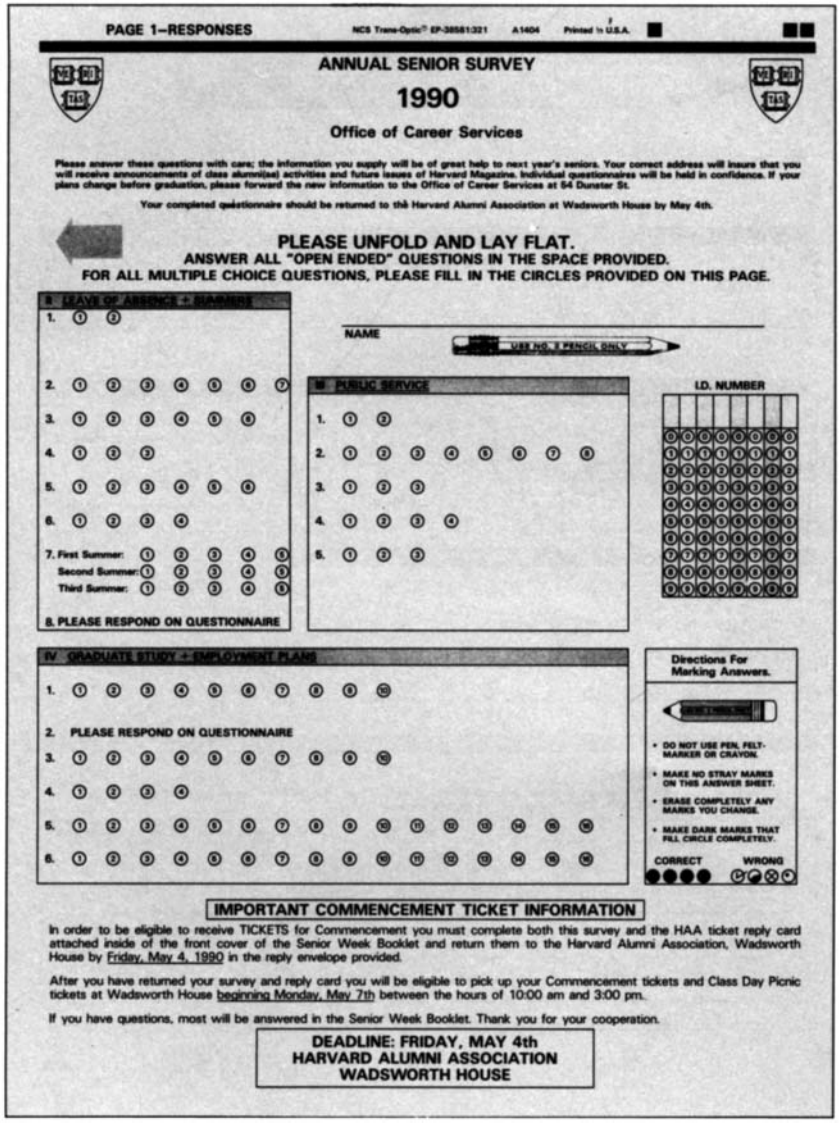
1. WHICH OF THE FOLLOWING GRADUATE OR PROFESSIONAL SCHOOL EXAMINATIONS DID YOU TAKE?
   1. GRE 2. GMAT 3. MCAT 4. MAT 5. LSAT 6. Foreign Service 7. Other
2. DID YOU TAKE A PREPARATION COURSE? 1. Yes 2. No
   IF SO, WHICH COURSE? _____

VIII FELLOWSHIPS + HONORS

1. OF THE FOLLOWING FELLOWSHIPS WHICH DO NOT REQUIRE SELECTION THROUGH THE FELLOWSHIPS OFFICE, TO WHICH DID YOU APPLY? CHOOSE ALL THAT APPLY.
   1. Coors
   2. DAAD
   3. Ford Foundation
   4. Hertz
   5. Howard Hughes
   6. Samuel Huntington
   7. Jacob Javits
   8. Josephine deKarman
   9. Kate Neal Kinley
   10. Lisle
   11. Amy Lowell Poetry Prize
   12. Mellon
   13. Monbusho
   14. NEH
   15. NSF
   16. Rhodes
   17. Rotary
   18. J.W. Saxe
   19. State Farm
   20. Time
   21. Other, please specify _____
2. WHICH DID YOU WIN? (PLEASE USE CODES LISTED ABOVE)
   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

IX GRADUATE SCHOOL APPLICATIONS

1. HOW DO YOU PLAN TO FINANCE YOUR GRADUATE EDUCATION? (CHOOSE ALL THAT APPLY)
   1. Scholarships 2. Loans 3. Grants 4. Family Contributions 5. Other _____
2. GRADUATE SCHOOLS TO WHICH YOU APPLIED. (SEE OPPOSITE PAGE)



PAGE 1–RESPONSES NCS Trans-Optic® EP-38581:321 A1404 Printed in U.S.A.

ANNUAL SENIOR SURVEY

1990

Office of Career Services

Please answer these questions with care; the information you supply will be of great help to next year's seniors. Your correct address will insure that you will receive announcements of class alumni(ae) activities and future issues of Harvard Magazine. Individual questionnaires will be held in confidence. If your plans change before graduation, please forward the new information to the Office of Career Services at 54 Dunster St.

Your completed questionnaire should be returned to the Harvard Alumni Association at Wadsworth House by May 4th.

PLEASE UNFOLD AND LAY FLAT.

ANSWER ALL "OPEN ENDED" QUESTIONS IN THE SPACE PROVIDED.

FOR ALL MULTIPLE CHOICE QUESTIONS, PLEASE FILL IN THE CIRCLES PROVIDED ON THIS PAGE.

II LEAVE OF ABSENCE + SUMMERS

1.
2.
3.
4.
5.
6.
7. First Summer:
Second Summer:
Third Summer:
8. PLEASE RESPOND ON QUESTIONNAIRE

NAME

USE NO. 2 PENCIL ONLY

III PUBLIC SERVICE

1.
2.
3.
4.
5.

I.D. NUMBER

IV GRADUATE STUDY + EMPLOYMENT PLANS

1.
2. PLEASE RESPOND ON QUESTIONNAIRE
3.
4.
5.
6.

Directions For Marking Answers.

USE NO. 2 PENCIL

- DO NOT USE PEN, FELT-MARKER OR CRAYON.
- MAKE NO STRAY MARKS ON THIS ANSWER SHEET.
- ERASE COMPLETELY ANY MARKS YOU CHANGE.
- MAKE DARK MARKS THAT FILL CIRCLE COMPLETELY.

CORRECT WRONG

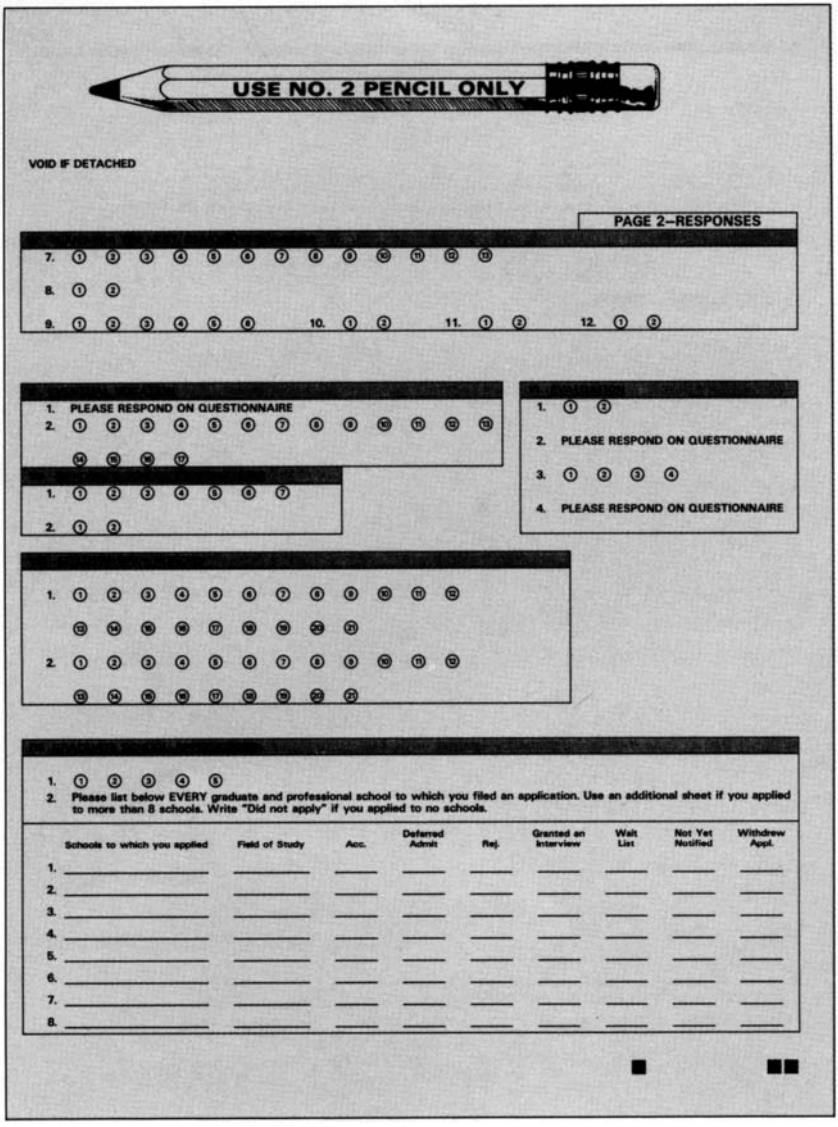
IMPORTANT COMMENCEMENT TICKET INFORMATION

In order to be eligible to receive TICKETS for Commencement you must complete both this survey and the HAA ticket reply card attached inside of the front cover of the Senior Week Booklet and return them to the Harvard Alumni Association, Wadsworth House by Friday, May 4, 1990 in the reply envelope provided.

After you have returned your survey and reply card you will be eligible to pick up your Commencement tickets and Class Day Picnic tickets at Wadsworth House beginning Monday, May 7th between the hours of 10:00 am and 3:00 pm.

If you have questions, most will be answered in the Senior Week Booklet. Thank you for your cooperation.

DEADLINE: FRIDAY, MAY 4th
HARVARD ALUMNI ASSOCIATION
WADSWORTH HOUSE


USE NO. 2 PENCIL ONLY
VOID IF DETACHED
PAGE 2--RESPONSES
7. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬
8. ① ②
9. ① ② ③ ④ ⑤ ⑥
10. ① ②
11. ① ②
12. ① ②
1. PLEASE RESPOND ON QUESTIONNAIRE
2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰
1. ① ② ③ ④ ⑤ ⑥ ⑦
2. ① ②
1. ① ③
2. PLEASE RESPOND ON QUESTIONNAIRE
3. ① ② ③ ④
4. PLEASE RESPOND ON QUESTIONNAIRE
1. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑
2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑
1. ① ② ③ ④ ⑤
2. Please list below EVERY graduate and professional school to which you filed an application. Use an additional sheet if you applied to more than 8 schools. Write "Did not apply" if you applied to no schools.
Schools to which you applied
Field of Study
Acc.
Deferred Admit
Rej.
Granted an Interview
Wait List
Not Yet Notified
Withdrew Appl.
1.
2.
3.
4.
5.
6.
7.
8.

References

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Comment

Charlotte V. Kuh

Jerry Green has dug up what can be described as a treasure trove of data about the intentions of Harvard undergraduates to attend graduate school. Harvard undergraduates may be a special group, but he has a virtual census of them and information concerning their postgraduation plans. As we look at these data, we need to remember that they are data about *intentions* gathered at one point in time. To ascribe broader significance to this data set, we need to look at other data to ask whether Harvard intentions mirror undergraduate intentions more broadly, how those intentions translate into outcomes, and what sorts of models could give rise to the data that have been presented. It is these three questions that I would like to address in my discussion.

Before doing that, however, I would like to mention briefly why these data are so interesting. The paper mentions the mounting concern and debate over the adequacy of Ph.D. supply to meet the increased demand for new faculty that is expected later in the 1990s. A broader source of concern is that production of highly trained American citizens is not keeping up with the growth of our population, let alone the growth of those parts of the economy that are relatively intensive in highly trained people.

Between 1978 and 1988, the U.S. population of age 25 to 34 grew by 26 percent (NCES 1990). In the same period, for U.S. citizens:

- Master's degrees declined by 4 percent
- Doctoral degrees grew by 8 percent
- First professional degrees grew by 6 percent

On the other hand, the rate of participation in graduate education of high-ability students has not changed over the past decade. Specifically, of those

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who scored in the top quartile in an ability test given as a part of two national surveys of high school seniors (High School and Beyond survey of 1980 and National Longitudinal Survey of High School Seniors in the Class of 1972), 12 percent of both groups were enrolled in graduate study seven years after high school graduation (Hilton and Pollack 1991).

Although graduate school attendance rates have been relatively constant, choice of undergraduate major has undergone large shifts in the past decade. Nationally, bachelor's degrees declined by 5 percent in the humanities and social sciences, by 29 percent in the biological sciences, by 23 percent in the physical sciences, and by 33 percent in education. The growth fields were computer science and engineering (96 percent) and business (52 percent). These changes in baccalaureate degrees are also reflected in higher degrees. (NCES, 1990.) Undergraduates do seem to gravitate, in impressive numbers, to those fields that reputedly will bring higher economic rewards.

Although the only data set on senior intentions to undertake graduate study is the COFHE data set that is discussed in the paper, we can look at other data to see how similar the field choice of Harvard graduates who obtain Ph.D.'s is to field choice nationally. These data would relate to the question, How indicative of national trends are the field choices of Harvard undergraduates? If they track fairly closely, then the Harvard data can be generalized and be used as a leading indicator of changes in Ph.D. supply to particular fields. These distributions are shown in table 5C.1.

With the exception of the biological sciences, to which there was a much greater shift by Harvard baccalaureates, there are similarities in both the direction and the size of the change in percentage distribution by field of the 1960–82 cohorts and the most recent (1986–88) cohorts. For Harvard, the source of the boom in biological science Ph.D.'s comes primarily at the expense of Ph.D.'s in nonscience and engineering fields, principally the humanities.

Table 5C.2 recasts the Green data to examine the question of what the recent direction of field switching has been. We note that the fields in Green's paper are not as disaggregated as the National Science Foundation data for Ph.D.'s shown in table 5C.1. I looked at two groups that overlap in some respects but differ in "quality": those who are directly graduate school bound (Trueac) and those who are academically gifted (high honors) as shown by both grades and an undergraduate research project. Approximately 25 percent of Trueacs receive high honors, while approximately 33 percent of high-honors graduates classify themselves as Trueac. What may be trends in field choice are evident. We see continued movement into the biological sciences and humanities by Harvard seniors and movement away from the physical sciences. Most worrisome, the movement out of the physical sciences is greatest in the high-honors group, although a higher percentage of this group still majors in these fields than of the less select Trueac group. The NSF data indicate, weakly, that Harvard graduates change fields in ways similar to Ph.D.'s nationally. Thus, we can conclude, at least tentatively, that we may

Table 5C.1 Percentage Distribution of Ph.D's by Broad Field

	Physical Sciences	Engineering	Biological Sciences	Social Sciences	Psychology	Other Science and Engineering	All Other Fields
Ph.D. year							
1960–82							
All	11.5%	9.9%	11.5%	9.3%	8.1%	8.5%	41.6%
Harvard B.A.'s	13.8	2.6	10.2	17.0	7.5	11.4	37.5
1986–88							
All	9.8	11.5	12.0	8.1	9.6	8.7	40.2
Harvard B.A.'s	11.4	3.2	21.0	14.1	8.4	11.6	30.0
Change in distribution							
All	−1.7	1.6	0.5	−1.2	1.5	0.2	−1.4
Harvard B.A.'s	−2.4	0.6	10.8	−2.9	0.9	0.2	−7.5

Source: National Science Foundation.

Table 5C.2 Percentage Distribution of Harvard Seniors

	Physical Sciences	Biological Sciences	Social Sciences	All Other Fields
Trueac				
1985–87	34.8%	12.5%	22.6%	30.0%
1988–90	30.4	13.9	17.2	38.2
High honors				
1985–87	49.3	5.1	14.3	31.1
1988–90	37.7	9.4	17.0	35.8
Change in distribution				
Trueac	−4.4	1.4	−5.4	8.2
High honors	−11.6	4.3	2.7	4.7

see an upswing in Ph.D.'s in the biological sciences and humanities in the mid-1990s. A worry about the supply of Ph.D.'s in the physical sciences may also be justified. The evidence for the social sciences is mixed.

I find section 5.6 on intended paths to academic careers to be among the most interesting parts of the paper. About 25 percent of Harvard seniors intend to go to graduate school at some point, and of these about half see an academic career in their future. The next step, which I hope Green will pursue, is to find out the slippage between intentions and actual outcomes. For Harvard seniors, some of this can be learned by matching reunion reports with senior surveys. One thing that I have found striking for my own class of Radcliffe women is how few of us are now doing what we planned to do on graduation.

It would also be interesting to match these data with additional data about the same individuals. Do choices on the senior survey vary systematically with earlier ability measures, such as SAT scores? Is socioeconomic status

(SES) important? In the national longitudinal surveys of high school seniors mentioned above, students from high SES backgrounds are much more likely than other students to attend graduate school (Ekstrom et al. 1991).

Finally, I would like to see Green apply his talents as an economic theorist to the question of what models of career choice and uncertainty are consistent with these data. I can outline three possible models:

1. A matching model. This model, familiar to economists, is one of rational career choice. A student gathers information about his or her abilities in college, becomes knowledgeable about alternative career options, and makes a rational choice. This model would use transcript data combined with salary data as the information that conditions career choice.

2. A social structure model. Here socioeconomic status would be a primary determinant of postgraduation choice. Regardless of their demonstrated ability, we might expect students from higher-SES families to choose higher-SES careers.

3. An uncertainty and postponement model. Students who seem to follow this model may be found concentrated in the humanities. Undergraduate performance does not give them enough information to predict with any certainty whether they will succeed in the academic labor market. They may be more likely to choose postgraduation alternatives that are ways of postponing making a career commitment.

What Green has observed in his very interesting data are student choices at an important moment in their lives. To know what gives rise to these choices, and how these choices evolve at later points in time, may be helpful as we try to understand fluctuations in the supply of Ph.D.'s—a rare and important social resource.

References

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