Education Economics, Vol. 2, No. 1, 1994

Determinants Among PhD Economists of Membership in a Professional Association

ARTHUR M. DIAMOND, JR & DONALD R. HAURIN

ABSTRACT *We tested hypotheses about the value of membership in the American Economic Association (AEA) and found that an economist is more likely to belong to the AEA if the economist was: male, from a highly ranked PhD school, active in publishing research, highly cited for publications, and not in either the business administration or the agriculture subfields. We also found that membership in earlier periods increased the likelihood of membership in later periods, independent of other characteristics. Data for the study consisted of information on 913 economists who received their PhDs in 1953, 1954 or 1955 from universities in the US.*

Introduction

Professional organizations, such as the American Economic Association (AEA), perform many diverse functions. Allocating scarce research resources and scarce journal pages are among the more important that fall under the heading of 'gate-keeping' functions. Through its job market, professional journals and meetings, the AEA has a large impact on which economists will get through the 'gate' to obtain the research assistants, low teaching loads and professional recognition that lie on the other side. The investigation of the gate-keeping function of the profession is well under way, especially in regard to the refereeing process (see Zuckerman & Merton, 1971; Crane, 1972; Hargens, 1988).

One gate-keeping function of the AEA is its role as a forum for certified research (publication in the *American Economic Review* is intended to imply that the work has undergone rigorous refereeing). The AEA also functions as a forum for economists to share information on their fellow economists—by paper presentations, the organized job market and informal contacts.

The results reported here should help us to understand how effective the AEA is at providing these services. If some subfields of research, methodological points of view or personal characteristics are systematically related to the probability that a person will not be a member of the AEA, then we have prima facie evidence that the AEA is not perceived as serving that group's interests. Stigler, for instance, has suggested that "as specialist journals emerged, perhaps more and more specialists have dropped out of the AEA" (letter dated November 1, 1985).

A. M. Diamond, Jr, Department of Economics, University of Nebraska at Omaha, Omaha, NE 68182, USA. D. R. Haurin, Department of Economics, The Ohio State University, Columbus, OH 43210, USA.

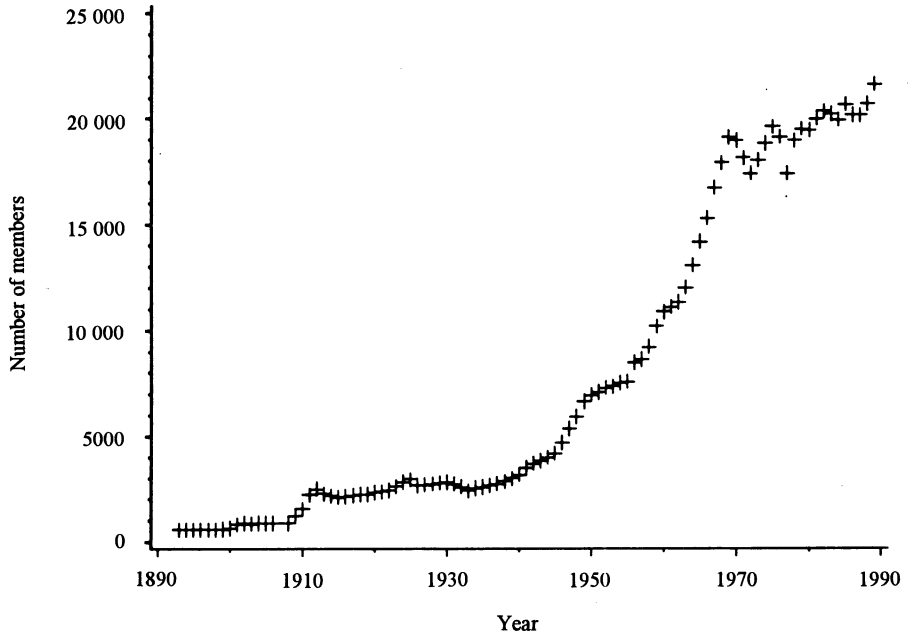

Figure 1. Number of members of AEA from 1890 to 1989. (*Source: American Economic Review*, 59, pp. 593–594 and May issues from 1970 to 1990. In 1976, the AEA instituted a progressive dues structure.)

AEA membership may be more valuable to those who are more likely to enter the job market, such as younger economists or economists with higher than average mobility (perhaps the very successful and the very unsuccessful?). If success, and hence mobility, depends in part on initial subfield choice, then we would also expect that the sample of economists consisting of members of the AEA would over-represent some subfields compared with the whole profession and would under-represent other subfields (see, for example, Goode, 1957; Parsons, 1968).

In the following pages, we make use of a longitudinal data set on a cohort of economists in order to understand better why some economists belong to the AEA and why others do not. We find that an economist is more likely to belong to the AEA if the economist is: male, in the beginning or middle stage of his career, from a highly ranked PhD school, active in publishing research, highly cited for publications and not in either the business administration or the agriculture subfields.

The Data

The number of members in the AEA increased very slowly for the first 60 years of its existence, roughly from 1890 to 1950 (see Figure 1). In the 20 years from 1950 to 1970, the membership roughly quadrupled, from about 5000 to about 20 000. In the last two decades, the membership has returned to a much more modest rate of growth.

Our aim was to study the population of American economists who received

their PhDs in 1953, 1954 and 1955 from universities in the US. We obtained our sample from the back of the September issues of the *American Economic Review* for 1953, 1954, 1955 and 1956. The issues listed information on PhD school, dissertation title and dissertation subfield for economists who received their PhDs in the just-ended academic year.[1] Thus, for example, most of the entries in the September 1953 list consisted of economists who received their PhDs in the 1952–1953 school year. We did not choose a cohort earlier than the 1953, 1954 and 1955 group because earlier cohorts tended to be smaller and to be less-well documented. We did not choose a cohort later than the 1953, 1954 and 1955 group because we wanted to be able to follow a cohort over most of its professional life cycle. If an economist from the cohort was 30 in 1956, he would have been 55 in 1981. Thus, we expected that almost all the 1953–1955 cohort members would still be professionally active in 1981. From the year-of-birth data reported by members of the cohort in either the 1956, 1969 or 1981 directories (some were not listed in any directory and some of those listed did not choose to report year-of-birth data), we are able to calculate the age for 56% of our sample. For those for whom we have data, the mean age in 1956 was 36 and the mean age in 1981 was 61. We suspect that this surprisingly high mean age may be due to economists who delayed their college and graduate education because of service in World War II. With a standard deviation for age of 5.6 and an assumed retirement age of 65, we inferred that over 75% of the economists in the cohort were still employed in 1981.

For the 1953–1955 cohort, we examined the 1956, 1969 and 1981 directories to learn which economists in the cohort had been members of the AEA in the year of the directory. These directories were selected in order to provide information on AEA membership near the beginning, middle and end of the economists' careers. (More directories could have been examined if the process had been less time intensive.) The directories list the names and mailing addresses of all those who were members of the AEA on a particular date (e.g. 1 June 1969, for the 1969 directory). In addition, biographical and career data are available in the directories for those economists who returned questionnaires. Although the names and mailing addresses of all current members of the AEA were included in the directories whether the members responded to the questionnaire or not, only those members who responded to the current questionnaire (or sometimes, to an earlier one) had biographical and career data included in their entry. Data on the membership size and the response rate for questionnaires for the various directories are reported in Table 1.

Unfortunately, the AEA used different subfield coding systems in the *American Economic Review*, the 1956 directory, the 1969 directory and the 1981 directory. In the journal, a single category for economists was reported, based on the subfield of the dissertation. In 1956, the economist was asked to "indicate, in the order of interest, your three general fields . . ." from among 16 categories and then was asked to check off as many specialties as applied under the categories. In 1969, the economist was asked to "indicate, in order of interest, your three general fields . . ." from among 12 categories and then was asked to check off as many specialties as applied under the categories. In 1981, the economist was provided with two blank boxes and was asked to "list fields with which you currently identify . . ." from among 48 categories. The 48 categories were grouped together under 11 broad headings. All the headings under a category would share the same first digit (so, for example, 820 is 'labor markets, public policy' and 850 is 'human

Table 1. Size and response rates for editions of the AEA directory

Year	Pages	Members	Returns	%
1938	112	2 800	2 400	85
1942	208	3 645	2 557	73
1948	345	5 700	3 232	57
1956	650	8 387	6 227	73
1964	480	11 285	9 308	83
1969	620	18 576	12 744	69
1981	566	19 310	15 310	79
1985	688	20 935	15 299	73

The source for the years 1938–1969 was the 1969 handbook (p. iii). The source for 1981 was an oral communication on 29 July 1985 with Mary Winer, Administrative Director, American Economic Association. The source for 1985 was an oral communication on 12 March 1987 with Mary Winer, Administrative Director, American Economic Association. Note that all members were listed in the directories, but that additional biographical and career information was only included for those who returned the questionnaire.

capital'). In the present study, we use subfield aggregations that we constructed in other research (Diamond & Haurin, 1993, 1994). In those studies, we aggregated the 1981 codes into 15 categories (usually following the broad headings used by the AEA). We then transformed the earlier coding in 1956 and 1969 into the same categories. An appendix, available upon request from the authors, provides details on the subfield aggregation and the transformation of codes into the 1981 categories.

For the present paper, we also have transformed the coding of the listings in the *American Economic Review* into the 15 broad categories. The 1953, 1954 and 1955 listings used the same classification system, which grouped dissertations into 16 subfield categories. In 1956, a new classification was introduced, consisting of 18 categories. Some of the categories mapped directly into categories in the 1981 classifications. For those that did not, we read the dissertation title and made a judgement on which 1981 category would be appropriate. A list of these transformations can be obtained from the authors.

The number of publications authored by each economist were obtained from the 1966–1970 and the 1976–1980 source volume cumulations of the *Social Science Citation Index*. The 1966–1970 and the 1976–1980 citation volume cumulations of this index were consulted to obtain the number of times other scholars had referred to each economist's works during those periods. The citations made during a given period (say 1966–1970) had to have been made during that period, but the work cited could have been written during that period or in any earlier year. The potential problems with citation counts are well known (see Diamond, 1986). One of the most noteworthy of these is that the counts only include citations that were made to publications for which the economist was the sole or first listed author. Noise in the data also results when two economists share the

same name, making it difficult to judge which economist received which citations.

Differences in the value of AEA membership by minority status have sometimes been claimed. The Committee on the Status of Women in the Economics Profession, for instance, has occasionally expressed dissatisfaction with the number of women presenting papers at the AEA's annual meetings (Reagan, 1978; Bergmann, 1985) and with the absence of blind refereeing of the *American Economic Review* (Edwards & Ferber, 1986). We have used the gender of first names to identify which members of the cohort are female, to see if sex matters in membership in the AEA.[2]

Our sample consists of those economists listed in the September 1953–1956 issues of the *American Economic Review* as having received their PhDs from universities in the US[3] from 1953 to 1955, inclusive. From the initial sample, we omitted four economists because their names prevented accurate counts of the number of times their work had been cited by others.[4] The final sample used in the analysis in the remainder of the paper consists of 913 economists. The subfield dummies indicate whether the economist was initially in a particular field ('1' means in the field, '0' means not in the field). The coding was based on the dissertation field as listed at the back of the 1953–1956 issues.

Since we searched for each economist in later directories using the name as it appeared in the earliest listing, we underestimated membership if many economists changed their last names between 1956 and 1981. In particular, this would be a problem for a woman who married during the period and adopted her husband's surname.[5]

We used published ratings of universities to rank the university from which the economists received their PhD and also the institutions of professional affiliation in 1956, 1969 and 1981. We classified universities into a highly ranked group (of 17) and a less highly ranked group (all the rest). In order to determine highly ranked schools at the time of receipt of the PhD, we made use of Keniston's 1957 ranking. In order of rank, the 16 universities in Keniston's ranking were: Harvard, Chicago, Yale, Columbia, Berkeley, Stanford, Princeton, Johns Hopkins, Michigan, Minnesota, Northwestern, Duke, Wisconsin, Pennsylvania, Cornell and UCLA. We added MIT to the list because it had received an honorable mention at the bottom of the 1957 ranking and because we believe that if departments in 1957 were ranked by economists today, MIT would definitely have made the top 16 (Samuelson had arrived at MIT in 1940; Solow arrived in 1949). All other institutions were grouped together in the less highly ranked group.[6] The published rankings on which this classification were based are summarized in Table 2. The number of PhDs graduated from each university during the 1953–1955 period is presented in Table 3. One surprising feature of Table 3 is worth note: Harvard, by itself, produced nearly 14% of the total PhDs during this period. Descriptive statistics for the final data set appear in Table 4.

Econometric Method

We assumed that membership in the AEA was an event in discrete time; each year an economist either belonged or did not belong to the AEA for the whole year. Let t_a take on a value of 1 if the economist belongs to the AEA in the year n and take

on a value of 0 if the economist does not belong. Then, examples of the actual patterns of membership in the AEA include:

	Time period				
Person	t_1	t_2	t_3	t_4	t_5
a	1	0	1	0	0
b	1	1	1	1	1
c	1	1	0	0	0

Unfortunately, we do not have data on membership in all periods, but only on periods in which a directory is issued, say t_1, t_3 and t_5.

An appropriate technique for estimating the likelihood that the dependent variable is 1 (membership) or 0 (non-membership) is either a probit or logit analysis depending on assumptions about the distribution of the error term. In our estimation, we used the logit likelihood function for each of the three periods on which we had membership data. In order to permit the plausible possibility of persistence (due either to unobserved heterogeneity or to state dependence), we included the membership status in earlier periods as an independent variable in the analysis for later periods.[7]

Table 2. Top 17 economics departments ranked by quality from 1925 to 1981

	Year of Ranking					
University	1925	**1957**	1964	1969	1979	1981
Harvard	1	**1**	1	1	1	3
Chicago	3	**2**	3	3	3	2
Yale	5	**3**	4	4	4	5
Columbia	2	**4**	9	12	*	15
Berkeley	*	**5**	5	5	5	7
Stanford	15	**5**	6	7	6	3
Princeton	11	**7**	7	6	7	5
Johns Hopkins	6	**8**	15	17	*	17
Michigan	7	**9**	8	7	8	13
Minnesota	13	**10**	11	7	*	7
Northwestern	14	**11**	12	12	*	7
Duke	*	**12**	*	*	*	20
Wisconsin	4	**13**	10	11	9	10
Pennsylvania	8	**14**	14	7	*	10
Cornell	10	**15**	*	18	*	19
UCLA	*	**16**	16	14	*	12
MIT	*	*	2	1	2	1
Carnegie Tech. (Mellon)	*	*	13	14	*	17
Rochester	*	*	*	16	*	13

The table is ordered according to the ranking in 1957, the year closest to the year of our cohort. *Indicates that the university was not rated in the relevant year. In the case of ties, more than one school may be assigned the same rating. The sources for the various year's ratings were: Keniston for 1925 and 1957; Cartter for 1964; Roose and Andersen (sic) for 1969; *The Chronicle of Higher Education* for 1979; unpublished survey by F. M. Boddy of University of Minnesota for 1981. All rankings are based on survey results. The following footnote was appended to the end of the 1957 ranking in Keniston (1959, p. 129): "According to some of the chairmen there are strong departments at Carnegie Tech. and MIT; also at Vanderbilt." Samuelson arrived at MIT in 1940; Solow arrived at MIT in 1949. Carnegie Tech is now Carnegie–Mellon.

Table 3. Economics departments ranked by quantity of PhDs graduated from 1953 through 1955

	Top 17 quality departments			Other departments		
University	No. PhDs	% of total	Quality rank 1957	University	No. PhDs	% of total
Harvard	125	13.7	1	NYU	37	4.1
Wisconsin	98	10.7	13	Texas	35	3.8
Columbia	64	7.0	4	Iowa State	32	3.5
Berkeley	58	6.4	5	Indiana	28	3.1
Chicago	51	5.6	2	Illinois	25	2.7
Minnesota	37	4.1	10	Ohio State	23	2.5
Pennsylvania	34	3.7	14	Iowa	21	2.3
Michigan	21	2.3	9	Virginia	13	1.4
MIT	17	1.9	*	Pittsburgh	12	1.3
Cornell	16	1.8	15	St. Louis University	12	1.3
Princeton	10	1.1	7	Southern California	11	1.2
Johns Hopkins	8	0.9	8	American	8	0.9
Yale	6	0.7	3	Georgetown	8	0.9
Duke	5	0.5	12	Nebraska	8	0.9
Northwestern	5	0.5	11	Catholic University	7	0.8
Stanford	4	0.4	5	North Carolina	7	0.8
UCLA	3	0.3	16	Kentucky	5	0.5
				Louisiana State University	4	0.4
Subtotal	562	61.6		Radcliffe	4	0.4
				Washington (Seattle)	4	0.4
				Clark University	3	0.3
				Florida	3	0.3
				Fordham	3	0.3
				George Washington	3	0.3
				Michigan State University	3	0.3
				New School	3	0.3
				Oklahoma	3	0.3
				Purdue	3	0.3
				Syracuse	3	0.3
				Texas A&M	3	0.3
				University of Colorado	3	0.3
				Fletcher School	2	0.2
				University of Lousiana	2	0.2
				Oregon	2	0.2
				Vanderbilt	2	0.2
				Washington (St. Louis)	2	0.2
				Boston University	1	0.1
				Brown	1	0.1
				Kansas	1	0.1
				Maryland	1	0.1
				Subtotal	351	38.4

The quality rankings are from the Keniston ranking in 1957, the year closest to the year of our cohort.
*Indicates that the university was not rated in 1957. Berkeley and Stanford tied for fifth and sixth places.

Table 4. Means for 1953–1955 cohort of economists

Variable	Number of observations	Mean	SD
Number of publications (1966–1970)	913	1.74	4.08
Number of publications (1976–1980)	913	1.68	3.67
Number of citations (1966–1970)	913	10.78	34.48
Number of citations (1976–1980)	913	24.31	77.70
Gender (female = 1)*	913	0.04	0.19
Received PhD from Top 17 University†	913	0.62	0.49
Age in 1981	515	60.70	5.59
Subfield dummy variables‡			
General economics	913	0.002	0.05
Theory	913	0.024	0.15
Methodology/history of thought	913	0.025	0.16
Economic history	913	0.025	0.16
Development	913	0.083	0.28
Statistics	913	0.034	0.18
Money	913	0.080	0.27
Public finance	913	0.050	0.22
International	913	0.068	0.25
Business administration	913	0.157	0.36
Industrial organization	913	0.126	0.33
Agriculture	913	0.160	0.37
Labor	913	0.164	0.37
Welfare/urban	913	0.001	0.03

*The coding was based on the person's first name and our knowledge of the person. All persons with first names that were judged 'female' were coded 1; all those with first names that were judged 'male' or could not be clearly categorized, were coded 0.

†The rank variable was equal to 1 for universities that were ranked in the top 17. Other PhD-granting institutions were assigned a value of 0.

‡The subfield dummies indicated whether an economist was initially in a particular subfield ('1' means in the subfield, '0' means not in the subfield). The subfield dummy means may be interpreted as the percentage of the economists who wrote a dissertation in a particular subfield. So, for example, the 0.160 coefficient for the agriculture dummy indicates that 16% of the economists in the sample wrote dissertations in the agriculture subfield. (The percentages do not exactly add to one because of rounding error.)

Empirical Results

To appear in our data set, an economist had to have been one of the 913 new PhDs listed in the *American Economic Review* as having completed their PhDs in 1953–1955. Economists in our cohort might be listed in each of the 1956, 1969 and 1981 directories, in none of them, or in any one or two of them. The possible patterns of appearance in AEA directories (for 1956, 1969 and 1981) are listed in Table 5 along with the frequency of occurrence of each pattern. Of the 913 economists in the cohort, 43.3% belonged to the AEA in 1956, 49.7% belonged in 1969 and 30.7% in 1981. Economists who were not members in any of the years studied made up 40.4% of the total, while those who were members in all the years were 20.0% of the total.

Of the 913 economists in our sample, 401 appeared in the 1956 directory, while 518 did not (and of these 518, there were 369 who also did not appear in either the 1969 or 1981 directories). This figure of 518 is surprising because it

Table 5. Patterns of economist listings in AEA directories

Pattern (1 = in; 0 = not in)			Number in each pattern	% in each pattern
56 Directory	69 Directory	81 Directory		
1	1	1	183	20.0
1	1	0	134	14.7
1	0	1	21	2.3
1	0	0	57	6.2
0	1	1	64	7.0
0	1	0	73	8.0
0	0	1	12	1.3
0	0	0	369	40.4
Column totals			913	99.9*

*The percentages do not add exactly to 100 due to rounding error.

seems to represent a large number of new PhDs who did not belong to the AEA at the start of their careers. We had thought new PhDs would find the journals and conventions of the AEA to be useful tools for the achievement of professional visibility. As an even stronger inducement to membership, we expected that the AEA's organized job market would be useful to the young economist seeking employment. However, the AEA was apparently much less active in facilitating the job market in the 1950s than it is today.[8] *Job Openings for Economists* has only been published by the AEA since 1974. In 1956, the only job market information published by the AEA was a three- to five-page listing at the back of each issue. Even in these listings, most of the space was devoted to economists announcing their availability. At most, only a page and a half consisted of universities seeking economists.

Besides the limited activity of the AEA in facilitating the job market, another possible explanation for the limited membership in 1956 is that economists planning to return to their native country found the publications of the AEA to be of less value than economists residing in the US. We suspect both that a non-trivial number of PhDs in the 1953–1955 cohort found employment outside of the US and also that foreign economists were less likely to be members of the AEA. Unfortunately, we did not observe the location of economists who never join the AEA, so the data did not allow us to confirm our speculations rigorously.[9]

One more issue that can be addressed with the data in Table 5 is the extent to which membership in the AEA is a reversible process. Of the 518 economists in the cohort who did not appear in the 1956 directory, 137 were listed in the 1969 directly. Another 12 were listed in the 1981 directory who appeared in neither the 1956 nor the 1969 directories. Of the 78 economists who were members in 1956, but had dropped out by 1969, 21 had rejoined by 1981. We can conclude that although most who exit the AEA do not return, a substantial minority do.

To learn more about the determinants of the decision to belong to the AEA, we estimated a binomial logit regression for each of the three years for which we have membership data. The logit estimates are reported in regressions 1 through 3 in Table 6. For each observation in the logit, the dependent variable is equal to 1 if the economist is listed in the respective directory and equal to 0 if the economist is not.

Table 6. Logit estimates of the probabilities that an economist was listed in the directory†

Variable	Logit regression number 1 In 1956 Directory		2 In 1969 Directory		3 In 1981 Directory		4 69/81 Pooled	
Dependent variable								
Constant	−0.447	(2.037)**	−0.707	(2.766)**	−3.260	(9.706)**	−0.828	(4.421)**
PhD from top 17 universities‡	0.630	(4.274)**	—		—		—	
Gender (= 1 if female)	−0.486	(1.319)	−0.860	(1.927)*	−0.105	(0.198)	−0.660	(2.032)**
Pubs. dum. (= 1 if any)§	—		0.763	(4.408)**	0.413	(2.119)**	0.625	(5.118)**
Number of citations	—		0.007	(1.734)*	0.005	(2.807)**	0.005	(3.565)**
In 1956 directory	—		2.255	(13.227)**	0.877	(4.494)**	1.985	(16.554)**
In 1969 directory	—		—		2.294	(10.061)**	—	
1981 Dummy	—		—		—		−1.163	(9.714)**
Subfield dummy variables¶								
Development	−0.002	(0.005)	−0.110	(0.294)	0.625	(1.633)	0.205	(0.803)
Money	0.122	(0.392)	−0.152	(0.406)	0.512	(1.325)	0.172	(0.671)
Public finance	0.696	(1.867)*	−0.776	(1.790)*	0.191	(0.422)	−0.414	(1.396)
International	0.262	(0.797)	−0.259	(0.649)	0.319	(0.810)	−0.060	(0.223)
Business administration	−1.151	(4.004)**	−1.050	(3.257)**	−0.719	(1.842)*	−0.939	(4.004)**
Industrial organization	0.006	(0.023)	−0.370	(1.120)	0.836	(2.450)**	0.134	(0.590)
Agriculture	−0.874	(3.190)**	−1.130	(3.522)**	0.576	(1.633)	−0.549	(2.453)**
Labor	0.160	(0.613)	−0.660	(2.086)**	−0.268	(0.799)	−0.519	(2.379)**
Number of observations	913		913		913		1826	
Number of observations with Dep. Var. = 1	395		454		280		734	
Number of observations with Dep. Var. = 0	518		459		633		1092	
−2 Log likelihood	1162.43		930.11		783.8		1859.46	

*Indicates statistical significance at the 10% level; **Indicate statistical significance at the 5% level.
†The absolute values of asymptotic t-statistics are reported in parentheses.
‡The rank variable equalled 1 if the person attended one of the 17 highest ranked universities and equalled 0 otherwise.
§In regression 2, the productivity measures are for the years 1966–1970. In regression 3, they are for the years 1976–1980. In regression 4 they are for 1966–1970, if the observation is from 1969 and for 1976–1980 if the observation is from 1981.
¶The subfield dummies equal 1 if the economist had that subfield as his initial subfield of specialization. The initial subfield was obtained from the 1953, 1954, 1955 and 1956 *AER* lists. The omitted comparison group consists of the those whose initial subfield was one of the six smallest subfields, viz.: general, theory, methodology/history of economic thought, economic history, statistics and welfare/urban.

The independent variables in the logit regression on membership in 1956 are:

(1) a dummy variable equal to 1 if the economist received a PhD from one of the top 17 graduate universities;
(2) a dummy variable equal to 1 if the economist is female;
(3) a set of dummy variables for various initial subfields of specialization.[10]

In the logit for the 1969 period, the independent variables included those listed above, except for the dummy variable equal to 1 if the economist received a PhD from one of the top 17 graduate universities. In addition, the 1969 logit includes: a dummy variable equal to 1 if the economist had been listed in the 1956 directory; a dummy variable equal to 1 if the economist authored any publications during 1966–1970; and the number of citations received by the economist during 1966–1970.[11] The dummy variable for top PhD school was included in the 1956 logit largely as a proxy for research productivity. Since better proxies are available for the 1969 and 1981 logits, in the form of publications and citations, the top-PhD school dummy was omitted from those logits.[12]

In the logit for the 1981 period, the independent variables included all those listed for the 1969 logit in addition to a dummy variable equal to 1 if the economist had been listed in the 1969 directory. The dummy variable for authoring any publications, and the variable for number of citations, covered a later period than the similar variables for the 1969 logit. In particular, in the 1981 logit, the publication dummy was equal to 1 if the economist authored any publications during 1976–1980, and the number of citations consisted of those received by the economist during 1976–1980.[13]

Our expectations about the sign of the coefficient for "the quality of the university from which the PhD was received" were somewhat ambiguous. On the one hand, those who received PhDs from better universities may be more likely to be active in research, or at least to be employed in an academic position. One might expect that the value of an AEA membership is in part to keep up with activity on the research frontier, so membership would be more valuable for those who aspire to be active on the frontier. On the other hand, those who received their PhDs from better schools may have better alternative sources of information on what is going on at the frontier. For them, a subscription to the *American Economic Review* may not be as important as to someone who is intellectually isolated. For the 1956 logit, we found that the coefficient for 'quality of PhD school' was positive and significant, indicating that the AEA better serves those from the better schools, at least early in their careers.

Women and blacks in the economics profession have sometimes argued that the evaluation system of the profession is biased against their success. One result of minority dissatisfaction with the AEA has been the formation of professional organizations explicitly designed to serve the interests of a particular minority.[14] Unfortunately, in the present study, we cannot examine the impact of race on the probability that a member of our cohort will be a member of the AEA because we have no information on the race of the members of our cohort.[15]

Fortunately, we can use the gender of an economist's first name to determine whether the economist is male or female. If women are discriminated against in the AEA[16] or if they are more likely to experience spells of reduced professional activity due to the allocation of time to the household, then we would expect that women would be less likely than men to be members of the AEA. The negative and

sometimes significant coefficient for the female dummy variable in the logits weakly confirms this expectation.

Many of the services of the AEA, such as the meetings and the journals, are presumably of more value to economists participating in academic research on the frontiers than to economists mainly focused on teaching or on consulting with business and industry. We would expect that measures of research productivity would be positively related to membership in the AEA during periods in which sufficient time has passed since the receipt of the PhD for there to have been measurable research productivity. We have included in the 1969 and 1981 logits both a measure of the quantity of research productivity and a measure of the quality of research productivity. The coefficients in the logits for 'whether published' and for 'number of citations received' were always positive and significant, as we would expect.

The subfield dummies were included in the logit to determine whether the value of membership in the AEA varied greatly by subfield. The *American Economic Review*, for instance, has become increasingly mathematical and thereby less useful to those in the more applied subfields (Kagann & Leeson, 1978). We would also expect those in separate (albeit related) disciplines with their own job market (e.g. the business administration category) to benefit less from the AEA's job market services and, hence, to be less likely to be members of the AEA.

Most of the coefficients of the subfield dummies in the three logits were not statistically significant.[17] The two that were most consistent, across logits, in sign and significance were business administration and agricultural economics. PhDs with business administration as an initial specialty were more likely to be in non-academic employment. If the job market benefits and the usefulness of the *American Economic Review* are greater for academics than non-academics, then we would expect that business administration specialists would be less likely to be members of the AEA.

Agricultural economics has become more like an independent field, apart from economics, than a subfield within economics. The existence of separate academic departments of agricultural economics on many campuses reflects this independence. As an independent field, specialists in agricultural economics would have their job market and journal services more fully satisfied outside of the AEA. The positive sign for the agriculture dummy in the 1981 logit may be because so many agriculture PhDs had dropped membership by then that those who remained in 1981 were a group self-selected for highly valuing membership in the AEA.

Among the variables with the most explanatory power in the 1969 and 1981 logits were the variables for membership in earlier periods.[18] These results may be interpreted as strong evidence in favor of persistence (due either to unobserved heterogeneity or to state dependence).

Logit number 4 in Table 6 reports the results for an alternative estimation method that pools the observations for 1969 and 1981.[19]

Conclusions

Using longitudinal data on the 1953–1955 cohort of PhD economists educated in the US, we have examined the determinants of membership in the AEA. We have found that of the 913 economists in the cohort, 43.3% belonged to the AEA in 1956, 49.7% belonged in 1969 and 30.7% in 1981. Economists who were not members in any of the years studied made up 40.4% of the total, while those who

were members in all the years were 20.0% of the total. Economists who received their PhDs at highly ranked schools were more likely to belong than those who received their PhDs at other schools. Women were less likely to belong than men. Economists who were productive in research, whether in terms of quantity or quality, were more likely to be members of the AEA. Economists who belonged to the AEA in an early period were more likely to belong during a later period. Finally, those who had specialized in the agriculture or business administration subfields were less likely than others to belong to the AEA.

Acknowledgements

We are grateful for able research assistance from Di Cao, Monica Densmore and Fran Mallory. Mary Winer, Violet Sikes and C. Elton Hinshaw of the AEA were very helpful in providing information on AEA membership and directories. However, neither the AEA nor any official of the AEA is any way responsible for the data analysis reported in this paper. We appreciate comments from William J. Barber, Jeanette Medewitz, Randall Olsen, John Pencavel and Warren Samuels. An earlier version of the paper was presented at the 1988 meeting of the History of Economics Society. A. M. Diamond is grateful for support from the University Committee on Research at the University of Nebraska at Omaha.

Notes

1. The listing first appeared in 1905. It appeared annually, in various issues, from 1906 to 1922. From 1923 to 1969 the listing appeared in the September issue. From 1970 to 1986, the listing appeared in the December issue. Starting in 1987, to the present, the annual list has been published in the December issue of *The Journal of Economic Literature*. During the years of our study, a typical title for the list is: 'Fiftieth list of doctoral dissertations in political economy in progress in American universities and colleges'. The title is misleading, since it does not lead the reader to expect (as is the case) that the entries are divided into two categories: 'Degrees conferred' and 'Theses in preparation'. We only make use of the listings in the 'Degrees conferred' category.
2. We thank Jeanette Medewitz for assisting us in our judgements of which foreign first names were feminine and which were masculine.
3. The lists included seven economists who received PhDs from McGill University in Canada and seven economists who received PhDs from the University of Toronto in Canada. We decided to eliminate these economists from the sample, because the university rankings used in the analysis did not include Canadian universities.
4. In particular, we omitted Alfred Glaze Smith, Jr and Arthur J. R. Smith because of confusion with each other and with Adam Smith. We also eliminated Warren E. Adams and William E. Adams because of confusion with each other.
5. We conjecture, however, that this is not a serious problem in our data set because: (1) very few economists in the 1953–1955 cohort were women, (2) of the women, some would not have married between 1956 and 1981, and (3) of those who married, some would not have assumed their husband's last name.
6. A slightly different list of highly ranked schools was used in judging the rank of the university of employment in 1969 and 1981 as reported in the descriptive statistics in Table 3. The list was the same as that used for rank of PhD university except that Duke and Cornell were dropped from the highly ranked group and Carnegie–Mellon was added to the highly ranked group. See Table 2 for the rationale for the differences.
7. An alternative method is to estimate a logit on the pooled data for the second and third periods. While this variation does not permit us to estimate persistence as fully as the previous technique, it compensates for this deficiency by permitting us to include a dummy variable equal to one for observations in the last period. This dummy variable naturally lends

itself to interpretation as an 'age' effect, although it could also proxy other changes between the second and third period (such as a change in the value of AEA membership).

8. John Pencavel has suggested that ". . . the job market dimension of the AEA meetings has become much more important in the last two decades and was of less importance 35 years ago" (communication to the authors, 17 April 1989).
9. We could attempt to distinguish those with 'foreign' sounding names. Also, we could check to see if those who never appear in the directories had disproportionately written dissertations in the international or developmental subfields, since those subfields are disproportionately chosen by foreign economists in recent cohorts (Diamond, 1988).
10. At the suggestion of Craufurd Goodwin, we obtained data on the real price of AEA membership over time. In 1967 dollars, the price was \$7.37 in 1956 and \$9.11 in 1969. In 1981 the pricing was more complicated. Still in 1967 dollars for both price and income, the price was \$11.01 for those with rank of assistant professor or lower, or with an annual real income of \$5138 or less. The price was \$13.21 for those with rank of associate professor, or with annual real income of \$5138–8808. For those with rank of full professor or with annual real income above \$8808 the price was \$15.41. Unfortunately, we could not include prices in the logits for 1956 and 1969 because in a given year the price would not vary for the economists. The price also would vary little in 1981 on the plausible assumption that a large percentage of the sample either were full professors or else were paid a real income over \$8808. We also considered using an economist's age as an independent variable in the logits; but we have year-of-birth data for only 56% of the economists in the data set. In addition, because our data set consisted of a cohort of economists who received their PhDs within a three-year period, the dispersion of the age variable was small, reducing the precision of the estimate of the coefficient for 'age'.
11. There is no reason for expecting that the effects of the productivity variables will be linear. We attempted to measure non-linearities by alternatively either estimating splines with a cut-off at one, or by adding squared terms. We were not able to estimate precisely non-linearities using squared terms. However, from an analysis of the spline results, we concluded that, beyond the first publication, the quantity of publications does not matter.
12. The coefficients for the top PhD dummy variables in the 1969 and 1981 logits were not significant when estimated in exploratory regressions.
13. Some variables that are plausible candidates for inclusion as independent variables in the logits were not included because of incomplete information for a substantial part of the sample. Most notably, in the second and third logits, we might have included data on the quality of the economist's university of employment in 1969 and 1981, respectively. We might also have included the economist's academic rank in each period. The difficulty with such variables is that the main sources for information on them are the directories of the AEA. It is very rare to have such information for economists who are not members of the AEA (and who, hence, do not appear in the directories).
14. Blacks formed the Caucus of Black Economists (now the National Economic Association) and women formed the Committee on the Status of Women in the Economics Profession (CSWEP). Diamond (1988, p. 85) has reported evidence on the number of black economists who join the AEA. His population of black economists consisted of persons listed in the 1979 directory of the National Economic Association (NEA). The directory had been intended to be an exhaustive listing of all black economists, whether or not they were members of the NEA. The 1979 NEA directory lists 227 persons who either completed the PhD or else were in the 'All but dissertation' category. Of the 227, only 72 were listed as members of the AEA in the 1981 AEA directory.
15. Starting in 1981, the AEA asked members to provide information on their race. Responses to the race question, however, must be interpreted with great caution since approximately one-third of the black members of the AEA did not identify themselves as black on the race question in the AEA survey (Diamond, 1988, p. 85).
16. The CSWEP has argued that referees judge a manuscript more harshly when they concluded, based on the gender of the first name, that the author was female. As a result, CSWEP is urging that the *American Economic Review* change to a system of blind refereeing, a change that is now under consideration (Sawhill, 1987; Hinshaw, 1988).
17. We attempted to relate the three series of subfield coefficients to the level of popularity of the subfield as measured by the percentage of new PhDs entering the area. The subfield coefficients were transformed into deviations from yearly means and collected into a single data set of size 24. Subfield popularity was based on data presented in Diamond and Haurin

(1994, Table 3). Although the sign of the coefficient of the subfield popularity variable was positive, it was not statistically significant.

18. In order to learn the robustness of our results, we estimated logit regressions 2 and 3 without the variables for membership in earlier periods. When we omitted these variables, we found that no previously insignificant coefficient became significant. In the 1969 logit, the constant, the public finance dummy and the labor dummy became insignificant; and the gender and the citations coefficients increased in significance (to the 5% level). In the 1981 logit, the business administration dummy increased in significance (to the 5% level) and the industrial organization dummy fell in significance (to the 10% level). Thus, we concluded that no substantive result emphasized in the text is changed when the variables for membership were omitted.
19. A likelihood ratio test indicated that it is appropriate to estimate separate logits for the 1969 and 1981 data. However, the results in the pooled logit (logit no. 4 in Table 6) were consistent with those in the other three logits. In addition, we found that the 1981 dummy variable was negative and highly significant. One obvious interpretation of this result would be that, as economists age from 1969 to 1981, they find membership in the AEA to be less useful. However, with our data from a single cohort, we cannot distinguish this interpretation from the alternative possibility that the usefulness of AEA membership declined in general from 1969 to 1981 (say because the *American Economic Review* became less useful).

References

American Economic Association (1953) Fiftieth list of doctoral dissertations in political economy in progress in American universities and colleges, *American Economic Review*, 43, pp. 764–795.

American Economic Association (1954) Fifty-first list of doctoral dissertations in political economy in progress in American universities and colleges, *American Economic Review*, 44, pp. 763–789.

American Economic Association (1955) Fifty-second list of doctoral dissertations in political economy in progress in American universities and colleges, *American Economic Review*, 45, pp. 777–802.

American Economic Association (1956) Fifty-third list of doctoral dissertations in political economy in progress in American universities and colleges, *American Economic Review*, 46, pp. 804–833.

American Economic Association (1957) Handbook of the American Economic Association, *American Economic Review*, 47, no. 4.

American Economic Association (1970) 1969 handbook of the American Economic Association, *American Economic Review*, 59.

American Economic Association (1981) Biographical listing of members, *American Economic Review*, 71.

Bergmann, B.R. (1985) Report of the Committee on the Status of Women in the Economics Profession, *American Economic Review*, 75, pp. 448–453.

Cartter, A.M. (1966) *An Assessment of Quality in Graduate Education* (Washington, DC, American Council on Education).

Crane, D. (1972) *Invisible Colleges* (Chicago, University of Chicago Press).

Diamond, A.M. Jr (1986) What is a citation worth? *The Journal of Human Resources*, 21, pp. 200–215.

Diamond, A.M. Jr (1988) Characteristics of minority members of the American Economic Association, *The Review of Black Political Economy*, 16, pp. 77–96.

Diamond, A.M. & Haurin, D.R. (1993) The dissemination of research agendas among young economists, *Journal of Economic Education*, 24, pp. 53–61.

Diamond, A.M. & Haurin, D.R. (1994) Changing patterns of subfield specialization among cohorts of economists from 1927–1988 *Research in the History of Economic Thought and Methodology*, 13 (in press).

Edwards, L.N. & Ferber, M.A. (1986) Journal reviewing practices and the progress of women in the economics profession, *CSWEP Newsletter*, October, pp. 2–7.

Garfield, E. (chairman) (1966) *Social Science Citation Index* (Philadelphia, Institute for Scientific Information, Inc).

Goode, W.J. (1957) Community within a community: the professions, *American Sociological Review*, 22, pp. 194–200.

Hargens, L.L. (1988) Scholarly consensus and journal rejection rates, *American Sociological Review*, 53, pp. 139–151.

Hinshaw, C.E. (1988) Minutes of the executive committee meetings, *American Economic Review*, 78, pp. 488–494.

Scully, M.G. (1979) How professors rated faculties in 19 fields, *The Chronicle of Higher Education*, January 15, p. 6.

Kagann, S. & Leeson, K.W. (1978) Major journals in economics: a user study, *Journal of Economic Literature*, 16, pp. 979–1003.

Keniston, H. (1959) *Graduate Study and Research in the Arts and Sciences at the University of Pennsylvania* (Philadelphia, University of Pennsylvania Press).

Parsons, T. (1968) Professions, in: Sills, D.L. (Ed.) *International Encyclopedia of the Social Sciences*, Vol. 12. (New York, Macmillan), pp. 536–547.

Reagan, B.B. (1978) Report of the committee on the status of women in the economics profession, *American Economic Review*, 68, pp. 448–453.

Roose, K.D. & Andersen, C.J. (1970) *A Rating of Graduate Programs* (Washington, DC, American Council on Education).

Sawhill, I.V. (1987) Report of the committee on the status of women in the economics profession, *American Economic Review*, 77, pp. 401–403.

Stigler, G.J. (1985) Letter dated November 1.

Zuckerman, H. & Merton, R.K. (1971) Patterns of evaluation in science: institutionalisation (sic), structure and functions of the referee system, *Minerva*, 9, pp. 66–100.