The Academic Labor Market for New Ph.D. Economists, 1960–1974

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The projected surplus of new Ph.D. economists entering the academic labor market in the late 1960's and beyond[1] has caused a number of economists to become concerned about the prospects of academic employment for economists. While the changing market conditions have already caused a slowdown in the rise of academic economists' salaries and an increase in reported unemployment,[2] for most new economists, the deteriorating conditions in the academic labor market will result in greater job dissatisfaction rather than unemployment. Many who aspire to academic posts will be forced "to take less attractive positions in government and industry, or teaching posts in lower education for which they are ill-prepared."[3]

In this paper we present a simple model explaining the allocation of new Ph.D. economists in the academic labor market and empirically test that model for the period 1960-1974. It is hoped that our analysis will shed some light on the operation of the academic labor market and on the recent decline in the status of the market for new Ph.D.s. We proceed as follows. In Section I a formal model of the hiring process in the academic labor market is developed and the data sources and specific variables used in the empirical analysis are described. In the following Section, several equations are estimated by ordinary least squares and logit regression analysis and the results are interpreted. Section III summarizes our findings.

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I. A Model of the Academic Labor Market for New Ph.D. Economists

Before constructing the model, it will be useful to have a general impression of the labor market under consideration. In general, the dominant pattern is for most new Ph.D.'s to find positions in departments of somewhat lower prestige than that of their graduate program. This "downstream" pattern is clearly shown in Table 1 which summarizes the allocation of new Ph.D.'s from the quality level of their degree granting program (row) to their initial placement at academic institutions of varying quality of Ph.D. programs and to other non-Ph.D. granting academic institutions (column).[4] For example, of the 1605 total academic placements made by Level I programs, 34 percent were employed at other Level I graduate programs. In addition, of the 600 total new Ph.D. graduates employed by Level I programs, 90 percent received their degrees from Level I institutions while only 1 percent came from non-rated programs. Clearly, graduates from the Level I institutions dominate placements in the 45 ACE "rated" departments. Approximately 73 percent of those employed by the "rated" departments during this period came from Level I graduate programs. Finally, the largest single academic employer of non-Level I Ph.D.'s is the Other Academic category consisting primarily of undergraduate institu-

TABLE 1. Academic Placement Distribution by Quality Rating of Ph.D. Granting and Hiring Institutions: 1960–1974

Degree Granting Institution	*Hiring Institution*	*Level I*	*Level II*	*Level III*	*Non-Rated*	*Other Academic*	*Total*
Level I	N =	540	158	183	258	466	1605
	Row %	34.0	10.0	11.0	16.0	29.0	100.0
	Column %	90.0	60.0	53.0	38.0	32.0	48.0
Level II	N =	40	85	54	153	229	561
	Row %	7.0	15.0	10.0	27.0	41.0	100.0
	Column %	7.0	31.0	16.0	23.0	16.0	17.0
Level III	N =	12	17	67	109	289	494
	Row %	2.0	3.0	14.0	22.0	59.0	100.0
	Column %	2.0	6.0	19.0	16.0	20.0	15.0
Non-Rated	N =	8	10	41	159	471	689
	Row %	1.0	2.0	6.0	23.0	68.0	100.0
	Column %	1.0	3.0	12.0	23.0	32.0	20.0
Total Employed from Column Levels	N =	600	270	345	679	1455	3349
	Row %	18.0	8.0	10.0	20.0	44.0	100.0
	Column %	100.0	100.0	100.0	100.0	100.0	100.0

tions. It is the task of this paper and our model to explain the existence of this "downstream" pattern in the academic placement of new Ph.D. economists.

We believe that Thurow's "job-competition" model is the most appropriate for analyzing the operation of the academic labor market for new Ph.D.'s.[5] Under that model, individuals compete for jobs based on background qualifications instead of competing against each other based on wages. Recent studies of the nonprofit sectors of the economy by Newhouse, Feldstein, and Freeman have stressed that the quality of services offered and the general reputation of the institution are important elements in the non-profit decisionmaker's maximand, or at least serve as constraints on his maximand.[6] According to Freeman, students, faculty, subsidizers, and university decisionmakers are highly concerned with the quality of educational inputs and outputs and the importance of quality in intellectual matters makes faculty quality the key market variable. "University departments use the average quality of departments rather than profits as the maximand and the quality of appointments, generally not the number, as the proxy variable" in the hiring decision.[7] Although we are primarily concerned with non-wage allocating mechanisms in this study, a conventional reduced form wage equation also will be estimated for the readers benefit.

In a job-competition model, two sets of factors determine an individual's placement in the academic marketplace. One set of factors determines an individual's relative position in the labor queue; another set of factors determines the actual distribution of job opportunities in the economy. Workers are distributed across job opportunities based on their relative position in the labor queue. The most preferred workers get the best jobs.[8]

But on what basis are new Ph.D.'s to be ranked? In general, academic departments rank prospective job candidates on the basis of their potential quality in research, teaching, and other university functions. Different departments may place different weights on each of these job functions. Since the costs required to identify quality differentials in individuals are

substantial, departments may adopt easily measurable hiring criteria that are believed to have some relevance to job performance. During the period under consideration, literally hundreds of new Ph.D. economists entered the academic labor market each year, and many other recently graduated economists attempted to find new employment. Since it is prohibitively expensive to screen all candidates, departments are forced to limit their intensive search to a reasonable size pool of candidates that are considered recruitable and of potentially high quality. For some departments this may mean interviewing only graduates from the most prestigious programs; while others, because of their own innate weaknesses, may search exclusively among the graduates of regionally located or relatively weak graduate programs. In our empirical analysis three separate, but closely related measures of the relative quality of academic institutions are available. For Ph.D. programs, the 1969 Roose and Anderson American Council on Education (ACE) quality of faculty rating or Moore's (1973) publication rating of graduate faculties can be used.[9] Undergraduate institutions have been rated by Gourman.[10] Since we are concerned in this study with individuals from Ph.D. programs not covered by the ACE survey and by the quality of hiring institutions, many of which do not have Ph.D. programs, we constructed a new ordinal quality rating system called Moore and Newman (M & N). Generally speaking, the M & N rating system is created by splicing the Moore publication ratings of Ph.D. programs with the Gourman undergraduate ratings.[11]

Unfortunately, using the reputation of the individual's degree awarding department as a quality proxy "provides the basis for discrimination, since job applicants then become viewed as members of classes of potential employees rather than as individuals, per se."[12] Moreover, even more subjective elements may enter the labor queue and serve as the basis for discrimination. If departments discriminate against candidates on the basis of sex or age, women and older Ph.D.'s will find themselves lower in the labor market queue than their academic credentials would warrant.[13] Although hiring departments may honestly believe that sex and age are related to expected performance, the end result is still discrimination since candidates are lumped into different classes. Institutions may be hesitant to hire women in general because of the potential loss of professional activities associated with child rearing and other family obligations, even though individual female candidates may have no marital or family obligations or plans. To test for the influence of these factors, we included a continuous age variable and a zero-one dummy variable having the value of one for females and zero for males in our model.

Several other factors are considered to have an influence on a department's attitude toward specific candidates. We used a dummy variable taking the value of one if the individuals reported any publications (PUB) in the AEA *Handbook* prior to their first position and zero otherwise. Of course, this variable is posited to have a positive influence on the institutions demand for the individual's services. A second dummy variable having the value of one if the individual is retained by his own department (RETENTION) and zero otherwise is included on the grounds that the information possessed about one's own doctorates is superior to that provided to other programs.[14] Finally, the average number of Ph.D.s awarded by the individual's graduate program for each year (SIZE) is used as an additional measure of quality. Cartter in his 1964 ACE ratings of graduate programs noted a strong positive correlation between the size and quality of programs.[15] Furthermore, a large number of ex-students scattered across the country aids placements through the informal labor market communication channels.[16]

Since we have argued that departments are more concerned with the quality than the cost of new faculty, no salary variable is included in our model of the demand for labor, which can be summarized in the following general equation:

$$D = D(\text{M\&N}_G, \text{SEX}, \text{AGE}, \text{PUB}, \text{RETEN}, \text{SIZE}) \quad (1)$$

where D refers to the institution's demand for the services of the individual, and the other variables are identified above. In this specification, new Ph.D.s are selected on the basis of background characteristics which are believed to be indicators of potential academic quality.

Unlike Thurow, who assumed that workers seek jobs with the highest real incomes,[17] we accept the conventional theory of labor supply; that workers attempt to maximize "net advantages" rather than income in their choice of occupations and employment. The evidence suggests that nonpecuniary factors play a substantial role in the employment decisions of economists. Historically, about two-thirds of all Ph.D. economists have been employed in education despite the fact that, in general, salaries are higher for such employees in non-academic careers.[18] For many years, sociologists have argued that "the prime motivation of those entering the academic profession is usually not financial gain,"[19] and that "an institution's attractiveness to a candidate is determined by what it can offer him in the way of prestige, security, or authority."[20]

These sentiments have been echoed recently by Niland, who contends that "within fairly broad limits, a new Ph.D. can be expected to seek out his first job at the best university offering him employment."[21] Not only is such a choice likely to be ego satisfying, but Johnson and Stafford have shown that such investments in human capital yield substantial benefits to economists over their lifetimes.[22] To capture this influence, we included the $\text{M\&N}_H$ quality rating of the hiring institution in our supply equation.

A number of other factors are expected to enter the candidate's utility function. As a measure of locational preference, we added a dummy variable taking the value of one, if the initial placement was in the same census region as the institution awarding their bachelors degree, and zero, otherwise. This variable (HOME) is interpreted to represent a "homing" instinct which has a positive influence on the candidate's willingness to offer his services. It should be noted that the RETENTION variable in our demand equation may have a similar supply interpretation.

In general, we expect new Ph.D.s to prefer positions with higher rank and greater tenure prospects. For this reason, several other dummy variables are added to the supply equation. A value of one is given individuals receiving initial appointments at the rank of associate or full professor (RANK) and zero otherwise for one variable. For the other, a value of one is accorded to a research (RESEARCH) or other non-department appointment and zero otherwise. Since the category assistant professor is omitted from the regressions, we anticipate a positive sign on the associate variable and a negative coefficient on the research variable.

The existence of a Ph.D. program is posited to have a positive influence on the candidate's desire to join a department. Ph.D. programs have a little added prestige in the profession and new Ph.D.s, who are largely trained to do research, are expected to be attracted to such programs because of the implied interest in research activities and support facilities. Again, a dummy variable (Ph.D.) having a value of one if such a program exists and zero otherwise is used in our supply equation.

Although SEX and AGE variable are placed in the demand equation, these factors also may influence supply preferences. Married females may be less mobile than males to the extent that they restrict their employment opportunities to the geographic area in which their husbands work. Also, older Ph.D.s may have different job interests from younger Ph.D.s. For

example older Ph.D.s may be reticent to invest further in their human capital by accepting positions at prestigious institutions with relatively poor tenure prospects. Therefore, our SEX and AGE variables, identified above are included in our supply equation.

Finally, job candidates are expected to be influenced by costs as well as preferences in their search for employment. As a rough measure of search costs,[23] we adopted Galloway's distance measure of the number of regional barriers crossed between the hiring and degree granting institutions (DIST).[24] Thus, using the nine census regions, the distance variable ranges from zero to six with the maximum value representing the distance between New England and the Pacific region. As a consequence of the national and regional meetings and the associated employment exchanges, it is not clear how important geographic distance may be in academic placements. If any, we expect this variable to have a negative influence on supply preferences. This concludes our discussion of the supply factors, which can be summarized in the following general equation.

$$S = S(\text{M\&N}_H, \text{HOME}, \text{RANK}, \text{RESEARCH}, \text{PH.D.}, \text{SEX}, \text{AGE}, \text{DIST}) \quad (2)$$

where S refers to the candidates willingness to offer his services to an institution and all of the other terms have been defined above.

Even given a labor queue and the supply preferences of individual candidates, however, there is still the problem of determining the actual distribution of job opportunities. As Thurow explains, ". . . the labor queue determines a group's relative position in the distribution of job opportunities but it does not determine the shape of the job distribution."[25] The best jobs go to the best workers, etc., but the shape of the job opportunities distribution need not be similar to that of the labor queue. "An equal group of laborers . . . might be distributed across a relatively unequal distribution of job opportunities."[26] In other words, in the job-competition model the labor market clears each period, but the average quality of the job obtained or the average quality of the candidate hired depends on the aggregate market conditions. In periods of labor scarcity, hiring will extend farther and farther down the labor queue; whereas, if there are an inadequate number of positions, those at the bottom of the labor queue will be forced to accept lower quality academic positions or seek non-academic positions. To account for this factor, we added a zero-one dummy variable for each year to our reduced form equations estimated in the next section.

II. Empirical Results[27]

Before looking at the empirical results, it will be useful to understand exactly what it is we are estimating. Whether or not a particular individual is hired by a department is the outcome of two distinct events: first, whether the individual wants to work for that department; the second, whether that department accepts him. Variables which affect the first event are supply factors, while variables which affect the second are demand factors. Formally:

Prob. (being hired) = Prob. (accepted by department | wants to work for the department)
X Prob. (wants to work for the department)

or, in abbreviated notation:

$$P_H = P_A \cdot P_W \quad (3)$$

Since the data do not indicate which persons attempted to work for any particular department and failed, it is impossible to identify the demand and supply schedules. We can only estimate their product, P_H, as a function of all the variables affecting either P_A or P_W. The estimated coefficients can be interpreted in the following way. Let X stand for any variable entering the regression equation for P_H. Then its estimated coefficient will be:

$$\frac{\partial P_H}{\partial X} = (P_W)\frac{\partial P_A}{\partial X} + (P_A)\frac{\partial P_W}{\partial X} \quad (4)$$

TABLE 2. Regression Results On Economists Academic Placements, 1960-1974

Dep. Variables (1)	$M\&N_H(16\text{-}20)$ (2)	$M\&N_H(16\text{-}20)$ (3)	$M\&N_H(10\text{-}20)$ (4)	$M\&N_H(16\text{-}20)$ (5)	$M\&N_H(16\text{-}20)$ (6)	Salary (7)
Ind. Variables						
DOWN	-.051*	-.622*	-.048*	-.045*	-.051*	-.206
	(-18.39)	(-12.09)	(-18.19)	(-13.72)	(-12.17)	(-9.59)
SEX	.0007	-.079	-.0456	.005	-.020	.391
	(.024)	(-.257)	(1.66)	(.115)	(-.506)	(1.74)
DISTANCE	.028*	.242*	.008	.026*	.029*	.153*
	(3.58)	(3.02)	(1.15)	(2.53)	(2.31)	(2.61)
HOME	-.012	.068	-.0054	.013	-.036	.244
	(-.484)	(.257)	(-.231)	(.307)	(-.949)	(1.28)
RETENTION	.135*	.370	-.039	.182*	.081	1.093*
	(3.04)	(.988)	(-.999)	(3.17)	(1.17)	(3.38)
AGE	-.007*	-.096*	-.0086*	-.009*	-.006	-.046*
	(-3.43)	(-3.59)	(-4.34)	(-3.36)	(-1.58)	(-2.85)
RANK	-.007	-.324	.016	-.039	.037	.840
	(-.190)	(-.374)	(.491)	(-.797)	(.730)	(3.10)
RESEARCH	-.028	-.463	-.047	.949	-.045	-.326
	(-.489)	(-.966)	(-.885)	(.024)	(-.619	(-.746)
PHD	.121*	1.472*	.4007	.162*	.105*	1.018*
	(4.37)	(4.61)	(15.67)	(4.47)	(2.55)	(4.86)
SIZE	.031*	.298*	.0248*	.037*	.028*	.180*
	(11.64)	(9.20)	(9.94)	(8.90)	(7.88)	(8.81)
1961	.186*	.970	-.0025	.167*	-.016	1.332*
	(2.24)	(1.13)	(.032)	(2.08)	(-.479) PUB	(2.09)
1962	.086	-.237	-.021	.096	–	.774
	(1.013)	(-.275)	(-.268)	(1.17)	–	(1.19)
1963	.022	-.826	-.038	.0009	–	-.107
	(.273)	(-.938)	(-.515)	(.011)	–	(-.176)
1964	.0002	-.246	-.0065	-.015	–	.217
	(.003)	(-.308)	(.088)	(-.196)	–	(.361)
1965	.031	-.083	-.054	.012	–	.681
	(.408)	(-.111)	(-.777)	(.170)	–	(1.19)
1966	-.071	-.938	-.049	-.107	–	.385
	(-.962)	(-1.22)	(-.709)	(-1.49)	–	(.681)
1967	-.057	-.776	-.199*	-.081	–	.127*
	(-.790)	(-1.05)	(-2.98)	(-1.16)	–	(2.32)
1968	-.125	-1.70*	-.127	-.172*	–	1.587*
	(-1.674)	(-2.20)	(-1.83)	(-2.34)	–	(2.80)
1969	-.118	-1.923*	-.174*	–	0	1.711*
	(-1.58)	(-2.43)	(-2.51)	–		(3.00)
1970	-.154*	-1.962*	-.250*	–	-.018	-.380
	(-2.17)	(-2.70)	(-3.78)	–	(-.312)	(-.702)
1971	-.176	-2.096*	-.256*	–	-.028	.795
	(-2.46)	(-2.88)	(-3.84)	–	(-.510)	(1.46)
1972	-.075	-1.145	-.135*	–	.075	1.594*
	(-1.008)	(-1.52)	(-1.96)	–	(1.21)	(2.82)
1973	-.137	-2.009*	-.123	–	.002	3.830*
	(-1.88)	(-2.64)	(-1.80)	–	(.026)	(6.86)
1974	-.063	-1.141	-.168*	–	.085	4.170*
	(-.808)	(-1.46)	(-2.32)	–	(1.27)	(7.03)
Constant	.487	1.279	-.712	.465	.345	8.648
	(4.94)	(1.13)	(-7.73)	(4.10)	(2.74)	(11.46)
$\bar{R}^2$	.474		.592	.531	.376	.396
Standard Error	.338		.318	.325	.351	2.604
N	921	921	921	465	458	921

*Indicates statistical significance at .05 or higher on the experiment one- or two-tailed test.

In equation (4), the first term is the department's response. When candidates differ in this respect (i.e., when $\partial P_A/\partial X$ is non-zero) we may call it discrimination or departmental preference. The second term reflects the candidate's preferences, and not departmental discrimination. The data will not distinguish between the two, but in some cases *a priori* considerations may lead us to believe that one or the other derivative is zero. In such cases the coefficient will be easy to interpret. In other instances, *a priori* considerations may suggest that the derivatives have the opposite signs. In these cases, the estimated coefficient may indicate which term dominates.

The above reasoning suggests an equation to explain departmental hiring of the following general reduced form:

$$P_H = F(\text{M\&N}_G, \text{SEX}, \text{AGE}, \text{PUB}, \text{RETEN}, \text{SIZE}, \text{M\&N}_H, \text{HOME}, \text{RANK}, \text{RESEARCH}, \text{PH.D.}, \text{DIST}) \quad (5)$$

Being hired is inherently a qualitative phenomenon. The variable H can take on only the values of 1 (for candidates hired) and 0 (for candidates not hired). Regressions to predict such a binary variable are estimates of the conditional probability of the left-hand variable (H), given the right-hand variables:

$$P_H = E(U|X) = F(X), \text{ or } U = F(X) + e$$

The simplest model for estimating such an equation is the *linear probability model*,[28] where $F(X)$ is a linear function. This has the computational advantage of yielding a linear regression, and the expository advantage of giving coefficients with obvious interpretations.[29]

Several variations of equation (5) were estimated using the linear probability model and the results are reported in Table 2. In column 2 the dependent variable has a value of one if the individual was hired by a department having a $M\&N_H$ quality rating of 16 to 20 and zero otherwise. In column 4 the dependent variable has a value of one if the individual was hired by a department having a $M\&N_H$ quality rating of 10 to 20 and zero otherwise. Both of these equations cover the period 1960-1974 and in general, tell the same story.

To avoid problems of multicollinearity, we have combined the $M\&N_G$ and $M\&N_H$ variables into a single variable representing the downstream effect in academic placements ($M\&N_G - M\&N_H$ = DOWN). In both equations, the DOWN coefficient is highly significant*[30] and negative, implying that, *ceteris paribus*, the greater the differential in quality ratings between the awarding and hiring departments the smaller the probability of the individual being hired. Each increase of the differential by one unit lowers the probability of the candidate being hired by a top department ($M\&N_H$ = 16 to 20) by .051.

The mean downstream placement for the 1960-1974 period was 4.069. Perhaps, some example movements would be useful in understanding this effect. On average, a new Ph.D. from a $M\&N_H$ 20-rated department (Cal., Berkeley, Harvard, MIT and Yale) is expected to take his first academic position at a $M\&N_H$ 16 rated department (Georgia Tech., Haverford, Iowa State, Oberlin and Rochester); new Ph.D.s from this level program are expected to take positions at $M\&N_H$ 12 rated departments (Cal., San Diego, Hawaii, Kansas State, and Pittsburgh) and graduates from these programs are likely to accept positions in M&N 8 rated departments (Cal., Riverside, Catholic Un., Kentucky, Binghamton and Oklahoma State).

Although the sex variable is not significant, the AGE variable clearly indicates that older new Ph.D.s are less likely to be employed in the higher rated departments. Because AGE can influence supply as well as demand choices, we make no claims that departments discriminate against older job candidates on the basis of age. Our findings are consistent with but not proof of that hypothesis.

The HOME, RANK, and RESEARCH variables failed to attain statistical significance in our equations, and the significant positive coefficient on the DISTANCE variable remains puzzling to the authors. An anonymous referee has suggested that individual tastes and preference toward the different regions may have caused the cost interpretation of this factor to be untenable. A professor on the East Coast (North) might find the West Coast much more attractive than the South, even though the latter is geographically much closer. Also, some states within the various regions may be more attractive to job candidates than others. Although each of these points raises doubts on the pure cost interpretation of the Distance variable, we are still unsure as to the specific reasons why a greater distance between the candidate and the hiring institution should increase the probability of the individual being hired.

The RETENTION variable is highly significant in the first (16-20) equation but not in the second (10-20) equation. This, of course, suggests that the top rated programs are far more likely to retain their own Ph.D.s than are lesser rated programs. Why not? They have better information on their own graduates and there is little reason *a priori* to believe they can recruit better candidates from other programs.

The PHD and SIZE coefficients are highly significant and positive as anticipated. We interpret the PHD coefficient to mean that Ph.D. programs had a .121 greater probability of hiring a given candidate, *ceteris paribus,* than did a non-Ph.D. program. The SIZE coefficient reflects a demand phenomenon. The size of graduate programs is positively correlated with its perceived quality in questionnaire surveys and graduates from larger programs are apt to have better contacts in the academic labor market.

The pattern of coefficients on the year dummy variables confirms the fact that new Ph.D.s had a more difficult time finding academic positions in the late 1960's and early 1970's. This is especially true for graduates outside the top graduate programs. The coefficients tend to have larger negative values in these years and are significant more often in the $M\&N_H$ 10–20 sample than in the $M\&N_H$ 16-20 sample.

Overall, the model explains 48 and 60 percent of the variance in the hirings of departments rated 16–20 and 10–20, respectively. This is quite high for individual cross-section observations. Nevertheless, to test the accuracy and reliability of the estimates in Columns 2 and 4, we reestimated the equation for the $M\&N_H$ 16–20 sample using a logit model.[31] The results presented in Column 3 of Table 2 are reassuring. All of the coefficients that are significant in the OLS equation (Column 2) also are significant in the logit equation (Column 3) except for the RETENTION and a few YEAR variables.

As a further check on our basic model, we subdivided the period into two parts, 1960–1968 and 1969–1974, and reestimated the model. In Column 5 of Table 2 the model is estimated for the $M\&N_H$ 16-20 sample over the period 1960 to 1968. The size, sign, and significance of the coefficients in this equation are virtually identical to those reported in Column (2) for the 1960 to 1974 period and the $\bar{R}^2 = .5817$ is slightly higher. Notice, also, the highly significant negative coefficient on the 1968 year dummy variable in this equation. This year apparently marks the turning point when the university job market swung sharply downward after having been on the upgrade for a decade. In Column (6) the same model is estimated for the period 1969 to 1974. Apparently, the academic labor market stabilized at a new lower level in terms of the quality of new Ph.D. placements after 1968. None of the year dummy variables recorded coefficients significantly different from the 1969 reference year variable. Clearly, the analysis of the YEAR coefficients in the Column (2), (5), and (6) equations suggests that a fundamental change in the University job market occurred during the 1968-1969 period.

Although the results of the basic model for the 1960-1968 equation (Column 5) and the 1969-1975 equation (Column 6) are basically the same, there are a few significant differences. The RETENTION and AGE variables failed to attain statistical significance in the latter equation. This suggests that hiring institutions were less likely to hire their own graduates in the relatively glutted academic labor markets of the late 1960's and early 1970's. Also, it appears that age has become a less important discriminating factor in recent years. Surprisingly, the zero-one dummy variable PUB having a value of one if the respondent reported publications prior to first job and zero otherwise is not statistically significant. We had anticipated that this factor might become more important under surplus labor market conditions. Its lack of significance, however, may be due to our failure to consider the quality of such publications, rather than the existence of publications, *per se.*

Thus far, we have concentrated on the job-competition model and have ignored salary considerations on the grounds that departments are more concerned with the quality than the costs of new Ph.D.s. However, if we add a salary variable to our supply and demand equations both, a conventional neoclassical reduced-form wage equation can be estimated.[32] Unfortunately, no data on the salaries of new Ph.D.s by department is available. We are forced to rely on the average salaries paid assistant professors by university reported in the *Bulletin* of the American Association of University Professors. This is undesirable for several reasons. First, it is unknown to what extent economists salaries are correlated with university salaries. Second, average salaries paid assistant professors could vary significantly from beginning salaries if time in rank varies systematically between universities. Finally, given the rough nature of the salary data, we transformed it into ordinal values. For each year, the salary figures were grouped into eighteen categories of $500 intervals with each university accorded a salary rating of one to eighteen according to the average salaries paid assistant professors. This transformation into relative salaries allowed us to group the observations over time (1960–1974) without deflating the salary figures for each year.

Although we do not have great confidence in our salary variable, the reduced form salary equation from our model is estimated by OLS and reported in column (7) of Table 1. There are relatively few surprises in that equation. The DOWN coefficient is negative and significant indicating that, the greater the quality differential between the degree granting department and the hiring department, the lower the salary received. Individuals who are fortunate enough to be retained by their graduate programs receive more pay than those who obtain positions elsewhere.

The significant negative AGE coefficient indicates, *ceteris paribus,* that older new Ph.D.'s are not as well compensated as more youthful Ph.D.'s. The RANK coefficient is positive and significant largely because we assumed that higher ranks were accorded higher pay levels in our salary calculations.

The significant positive coefficient on the Ph.D. dummy variable confirms the widely held belief that Ph.D. programs pay higher salaries than non-Ph.D. programs. Finally, the SIZE quality variable suggests that candidates from the larger graduate programs are favorably compensated either because of their perceived superiority or superior market contacts.

The YEAR coefficients in the salary equation are not discussed because there is reason to believe our construction of the ordinal salary variable may have biased these variables. We made no attempt to deflate the nominal salary figures despite the rising price levels over the period.

III. Summary and Conclusions

The dominant pattern in the academic labor market is for most new Ph.D.s to find initial employment in departments of somewhat lower prestige than that of their graduate program. In an attempt to explain this "downstream" pattern in academic placements. We developed a simple model of the hiring process in the academic labor market along the lines of Thurow's job-competition model. Next, using ordinary least squares regression analysis and logit techniques, several equations were estimated to test the validity of our model and its stability over time. We found that a number of background characteristics of the individuals such as age, and the quality and size of their graduate programs, play an important role in their initial academic placements. Also, top rated departments, at least in the early 1960's, recruited their own doctorates more frequently than other departments, probably because they have superior information about them and perhaps because they are unlikely to recruit better elsewhere in relatively tight labor markets.

Further, our analysis shows a marked deterioration in the academic labor market for new Ph.D. economists in the late 1960's and early 1970's. Since 1968, new Ph.D.s have had a more difficult time finding academic positions. The pattern of coefficients on the year dummy variables clearly shows a fundamental difference in the University job market between the period of 1960 to 1968 and the period 1969 to 1973. Although the decline has been greatest for graduates outside the top graduate programs, our analysis indicates that this latter group has been significantly affected as well. As a result of the bumping process along the labor queue, probably only a small percent of the very best graduates have been left unaffected by the market downturn. The decline in the academic labor market has forced large numbers of new Ph.D.s to seek non-academic employment. According to figures taken from the *AEA Handbook*, the total academic placements as a percentage of the Ph.D.s conferred in economics declined from 46.2 percent in 1967 to only 35.8 percent in 1973. Just as Alan Cartter, quoted in the introduction to this paper, predicted, many who aspired to academic posts were forced "to take less attractive positions in government and industry, or teaching posts in lower education for which they are ill-prepared."[33] Moreover, as Cartter further noted the situation is likely to become considerably worse before it gets better. After 1978, the 18-21 age group will shrink by nearly 20 percent over the following decade. Clearly there is little reason for optimism with respect to the academic labor market in the foreseeable future.

References

1. Alan M. Cartter, "Whither the Market for Academic Economists?" *American Economic Review: Papers and Proceedings*, Vol. 61, No. 2 (May 1971), 305–310; Lindsey R. Harmon, "The Supply of Economists in the 1970's," *American Economic Review*, Vol. 61, No. 2 (May 1971), 311–315.
2. Francis M. Boddy, "Recent Behavior of Economists' Salaries," *American Economic Review*, Vol. 61, No. 2 (May 1971), 316–320; and Elton C. Hinshaw, "The Current Market for Economists," in *Job Openings for Economists*, Nashville, Tenn., The American Economic Association, December 1974; and "Salary and Specialization Demand Patterns," in *Job Openings for Economists*, Nashville, Tenn.: The American Economic Association, February 1975.
3. Cartter, *op. cit.*, p. 309. Others who share this concern are Robert P. Strauss, "A Younger Economist's Views on the Market," *American Economic Review: Papers and Proceedings*, Vol. 61, No. 2 (May 1971), 327–333; and Kathleen Brook and F. Ray Marshall, "The Labor Market for Economists," *American Economic Review: Papers and Proceedings*, Vol. 64, No. 2 (May 1974), 488–511.
4. The 1969 ACE ratings consisted of a numercial ranking of the top 19 departments, which we shall call Level I, 10 additional departments rated "good" which we shall call Level II, and 16 other departments rated "adequate," which we refer to as Level III. The remaining graduate programs in economics included in that survey and other programs that were not included were relegated to the status of being "non-rated." See Kenneth D. Roose Charles J. Anderson, *A Rating of Graduate Programs*, Washington, D.C.: American Council on Education, 1970. The authors wish to thank Charles J. Anderson and the ACE for making available the unpublished 1969 raw scores for "Quality of Graduate Faculty" for the ninety-one programs surveyed.
5. Lester C. Thurow, "Measuring the Economic Benefits of Education," in Margaret S. Gordon (ed.), *Higher Education and the Labor Market*, New York: McGraw Hill Book Company, (1974), 373–418.
6. J. P. Newhouse, "Toward a Theory of Nonprofit Institutions: An Economic Model of a Hospital," *American Economic Review*, Vol. 60, No. 1 (March 1970), 64–74; Martin Feldstein, "Hospital Cost Inflation: A Study of the Nonprofit Price Dynamics," *American Economic Review*, Vol. 61, No. 5 (December 1971), 853–872; and Richard B. Freeman, "Demand for Labor in a Nonprofit Market: University Faculty," in *Labor in the Public and Nonprofit Sectors*, edited by Daniel S. Hamermesh, Princeton, New Jersey: Princeton University Press, 1975, 85–129.
7. Freeman, *ibid.*, p. 106.
8. Thurow, *op. cit.*, p. 390.
9. We used Moore's Ia rating of graduate faculties which is based on the number of articles published by faculty members between 1958–68 in the following nine major economic journals: *American Economic Review, Econometrica, Economica, Economic Journal, Journal of Political Economy, Quarterly Journal of Economics, Review of Economics and Statistics, Review of Economic Studies*, and *American Economic Review Proceedings*. The Spearman rank correlation coefficient between the forty-five "rated" ACE programs ranked by their "raw scores" on quality of faculty and their article contributions to the nine journals is a highly significant 0.62. See William J. Moore, "The Relative Quality of Graduate Programs in Economics, 1958–1972: Who Published and Who Perished," *Western Economic Journal*, Vol. 11 (March 1973), 1–23.
10. Jack Gourman, *The Gourman Report (Ratings of American Colleges)*, The Continuing Education Institute, Inc., 1967.
11. The M&N rating was obtained as follows. First, the Ph.D. schools covered in the Moore Study were classified into 14 groups on the basis of their Moore Publication rating, roughly in groups of five. Next, the Gourman undergraduate rating was assigned to each graduate school in the sample and the mean Gourman score for each of the 14 groups was calculated. This resulted in an average Gourman score being associated with each of the 14 Ph.D. groups. All schools, both graduate and undergraduate, having a Gourman rating approximately equal to that of the 14th Ph.D. groups or higher were then assigned to the groups whose average Gourman rating was considered closest to theirs. In a few cases the decision to classify a particular school in a higher or lower group had to be made subjectively. Finally, since a very large number of schools reported Gourman scores significantly below the Gourman average for the 14th level Ph.D. group, the number of M&N groups was expanded to 20 with those having a Gourman undergraduate score of 380–399 given an M&N rating of 6; 361–379 a 5; 341–360 a 4; 321–340 a 3; 300–320 a 2; and 2–299 a 1. Thus, all of the schools reported in the sample were assigned an M&N quality rating ranging from 1 to 20. It should be noted that separate equations for samples of Ph.D. schools were estimated using the ACE and Moore quality

ratings and virtually identical results were obtained.

12. Richard L. Peterson, "Economics of Information and Job Search: Another View," *Quarterly Journal of Economics,* Vol. 86 (February 1972), 127-131.
13. The primary data sources for the study are the 1969 and 1974 *Handbook* of the American Economic Association. Each entry in the Handbook provides information on the source of the individual's degree, the first placement in the academic market, and the sex [by name] and age of the respondent. A simple sampling procedure was followed in which every fourth complete observation and all complete women observations were included in the sample. We also attempted to limit the sample to Ph.D. economists by eliminating from consideration those individuals indicating business as their primary field of interest and those with specialized degrees such as D.B.A.'s. Dissertation titles were also screened for non-economist graduates.
14. See in this regard, George J. Stigler and Claire Friedland, "The Citation Practices of Doctorates in Economics," *Journal of Political Economy,* Vol. 83 (June 1975), 477-508.
15. Alan M. Cartter, *An Assessment of Quality in Graduate Education,* Washington, D.C.: American Council on Education, 1966.
16. At one point, the authors thought that the size of the graduate program might have a negative influence on perceived quality since risk averse departments might have a preference for hiring graduates from smaller but equally prestigious programs which are believed to have superior quality control.
17. Thurow, *op. cit.,* p. 396.
18. See in this regard, Arnold N. Tolles, Alice H. Jones, and Ewan Clague, "The Structure of Economists' Employment and Salaries, 1964," *American Economic Review,* Vol. 55, No. 4 (December 1965); Yoram Weiss, "Investment in Graduate Education," *American Economic Review,* Vol. 61, No. 4 (December 1971), 833-852; and George E. Johnson and Frank P. Stafford, "Lifetime Earnings in a Professional Labor Market: Academic Economists," *Journal of Political Economy,* Vol. 82, (May/June 1974), 549-569.
19. Logan Wilson, *The Academic Man: A Study in the Sociology of a Profession,* New York: Oxford University Press, reprinted in New York: Octagon Books, Inc. 1954, p. 136.
20. Theodore Caplow and Reese J. McGee, *The Academic Marketplace,* New York: Basic Books, 1958, p. 137.
21. John R. Niland, "Allocation of Ph.D. Manpower in the Academic Labor Market," *Industrial Relations,* Vol. 11 (May 1972), 141-156.
22. Johnson and Stafford, *op. cit.,* p.
23. George J. Stigler, "Information in the Labor Market," *Journal of Political Economy,* Vol. 70 (Supp., October 1962), 94-105 has shown that in a market having homogeneous labor and a dispersion of wage rates, "a worker will search for wage offers (and an employer will search for wage demands) until the expected marginal return equals the marginal cost of search."
24. Lowell E. Gallaway, "Industry Variations in Geographic Labor Mobility Patterns," *Journal of Human Resources,* Vol. 2, No. 4 (Fall 1967), 461-474.
25. Thurow, *op. cit.,* p. 396.
26. *Ibid.*
27. Our interpretation of the empirical results presented here has been greatly aided by reading Alan S. Blinder, "Who Joins Unions?" Working Paper No. 36, Industrial Relations Section, Princeton University, February 1972.
28. There are alternative models, such as the probit and logit models, but these require expensive non-linear estimation techniques. For a discussion of these models see Robert S. Pindyck and Daniel Rubinfeld, *Econometric Models and Economic Forecasts,* New York: McGraw-Hill Book Company, 1976, pp. 245-265.
29. Of course there are some problems involved in estimating a linear probability model. The presence of heteroscedasticity in the error term results in a loss of efficiency, but does not in itself result in either biased or inconsistent parameter estimates. Also, the predicted value of the dependent variable may range between $-\infty$ and $+\infty$ even, although its interpretation as a probability requires that it lie in the unit interval. Finally, the classical tests of significance do not apply in the usual way. The size of the t-statistics, however, can still be used to test hypotheses with the estimated coefficients for large samples (see Pindyck and Rubinfeld, *ibid.* p. 241.
30. Coefficients significant at the .05 level or higher on the appropriate one or two tailed tests in Table 2 are indicated with an *.
31. For a reference to this model see footnote 28. We wish to thank our colleague Mark Wilson for his help in estimating the logit equation.
32. Perhaps, it should be noted that even if we had included a salary variable in the supply and demand equations from the start, we would have excluded it from the reduced-form quantity equation because salary is endogeneously determined. Thus, the reduced-form quantity equation is identical to the one reported in Table 2 whether salary is included in the model or not.
33. See footnote 1 for source.