

# ON (AND OFF) THE HOT SEAT: AN ANALYSIS OF ENTRY INTO AND OUT OF UNIVERSITY ADMINISTRATION

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## Abstract

We use unique data for economists at top research departments in the postwar era to study the timing into and out of department chair and its relation to subsequent administrative positions. Our theoretical model predicts and empirical results confirm that the rate at which knowledge depreciates reduces the entry and exit hazards for the chair position. Prior service as chair and higher field-specific depreciation rates also raise the hazard of moving into upper administration. Overall, this suggests that administrators are made not born and that the growing specialization and technical nature of many professions could affect who chooses administrative careers and when these career choices are made.

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## **I. Introduction**

Higher education, a historically vital and successful U.S. industry (Ehrenberg, 2002; Thelin, 2004), is presently facing as treacherous a budgetary climate as it has felt in the last century due to the global financial crisis that began in 2008. The resulting significant reduction in institutional endowments and state support has forced both public and private institutions to contemplate double digit tuition increases despite recession-driven increases in financial need that could harm access for years to come (Cohen, 2009; Zezima, 2009). Given that these events have accelerated what is an ongoing public disinvestment in higher education, the need for strong and creative leadership at both the department and university level is essential for the industry to navigate these difficulties (Graham, Heiman, and Williams, 2007).

Social scientists have long recognized the importance of administrators in enabling public and non-profit organizations to effectively fulfill their public service missions (e.g., Hennessey, 1998; Brudney, Hebert, and Wright, 1999; Thompson, 2000; Kim, 2002) and have extensively catalogued the personality traits, managerial styles, and organizational knowledge that foster successful leadership in these organizations (Fiedler, 1967; House and Mitchell, 1974; Hersey and Blanchard, 1982; Hofstede, Neuijen, Ohayv, and Sanders, 1990; Schein, 1992; Trice and Beyer, 1993; Khademian, 2002; Rainey, 2003; Wagenaar, 2004). However, relatively few studies have investigated the traits of those who become leaders in higher education (Siegfried, 1997; Ehrenberg, Epifantseva, and Moore, 2000; Newman, and Turnbull, 2004; McDowell, Singell, and Stater, 2009) or what factors affect when their administrative careers begin and end.

This paper examines the factors affecting the timing of decisions to enter and exit the position of department chair in top research departments in economics and its relation to subsequent administrative positions. Department chairs are essential to the academic enterprise

because they manage the daily academic operations of the institution, coordinate and work with higher level administrators, and to a large extent form the pool from which upper-level administrators are drawn (Moore, Newman, and Turnbull, 2004; Graham, Heiman, and Williams, 2007). Career timing of entry into leadership is important because it affects the professional expertise, institutional knowledge, and professional networks that an individual brings to the position, which are inputs to leadership effectiveness (Rainey, 2003). Career timing of exit and promotion into upper-level administration, in contrast, determines who will be in a position to affect the operations of departments and institutions over the long term. We consider how research productivity and the durability of knowledge in an economist's field of study affect career timing for administrators, as these factors shape the portfolio of human capital that a leader brings to the position.

Our results suggest that the rate at which knowledge depreciates in an economist's field of inquiry not only reduces the hazard of entry into the chair position, but also reduces the hazard of exit from the position for those who are already serving. Economists who have higher observed research productivity are also found to have lower hazards of entering administration, but higher hazards of exiting. Thus, the prospect of sacrificing a large amount human capital is a deterrent to both the entry and exit decisions for administrative service, perhaps due to the cost of re-establishing research trajectories in high-depreciation fields. Nonetheless, prior experience as chair, greater field-specific depreciation rates, and lower observed research productivity are all found to increase the hazard of a move into upper-level administration, suggesting that such jobs can act as an absorbing state for some academics. These results support our theoretical model that predicts academics are less likely to choose administrative careers as the opportunity costs (in terms of foregone research) increase. It follows that the growing technical and specialized

nature of some professions could alter who among the academy select into administration and the timing of the career path into these managerial posts.

Most professional organizations are hierarchal in nature and promote workers through the ranks from positions where the skills necessary to perform entry-level jobs would depreciate in absence of regular investments (e.g., law, architecture, engineering firms). Thus, our model and empirical results are likely to generally apply to broad categories of professional organizations. Nonetheless, the focus on a particular type of administrator (department chair at a top research department) within a particular profession (economics) in a particular industry (higher education in the U.S.) is an important part of the research strategy; in particular, this approach limits the role of unobserved heterogeneity in the leadership selection process, allows output and productivity to be measured in consistent ways even across different organizations, and allows knowledge durability to be measured precisely and consistently. In other words, the unique attributes of the academic market in which there is a well-defined hierarchy, a publicly documented output that is relatively easy to observe and measure over a career, and where comparably trained individuals can be observed to face different human-capital depreciation rates provide the necessary conditions to test the broad expectation that the attributes and early-career experiences of workers determine their subsequent management opportunities.

The remainder of this paper is organized as follows. The next section reviews the related literature on the determinants and career consequences of department chair service. In Section 3 we develop a theoretical model of the decisions to enter and exit administration. We test the predictions of our model using the data and empirical methods described in Section 4. The results are presented and discussed in Section 5, and Section 6 offers our concluding remarks.

## **II. Related Literature**

Prior research on department chairs primarily focuses on how faculty salaries and research productivity are affected by terms of service as chair. Ragan and Rehman (1996) study faculty at Kansas State University from 1965-92 and find that there is a 12 percent wage premium for those serving as department heads, while there is no premium for past service as head. There are numerous other studies that focus on the more general issue of the wage structure in academia, with service as chair among the explanatory variables for faculty earnings (Siegfried and White, 1973; Tuckman and Leahey, 1975; Saks, 1977; Katz, 1978; and Sauer, 1988). Most of this work finds a substantial earnings advantage for department chairs, ranging from 15 to 30 percent, which persists for a considerable amount of time after the person steps down from the position. According to Hamermesh, Johnson, and Weisbrod (1982), this earnings premium is not homogeneous throughout higher education, but depends positively on the prestige (i.e., research ranking) of the department.

The higher wages of department heads are a compensating differential not only a task deemed as secondary by many academics, but for the depreciation of research skills and lower future wage growth that results from time spent in an administrative position (Moore, Newman, and Turnbull, 2004). Goodwin and Sauer (1995) and Ragan and Rehman (1996) both find that there is a substantial decline in research productivity both during and after a term of service as department chair. McDowell (1982) finds that skill depreciation is faster in the sciences than in other disciplines and that career interruptions accelerate human-capital depreciation. Ragan and Rehman (1996) confirm these findings, suggesting that knowledge becomes less durable as the quantitative rigor and technical complexity of a subject increase. The framework we develop below maintains the assumption that this relationship holds not only across different disciplines

in the academy, but within the particular discipline of economics as well that has been shown to have distinctly different depreciation rates by field (e.g., McDowell, 1982).

A complementary strand of literature, based on the neoclassical theory of human capital accumulation (Becker, 1962, 1971; Ben-Porath, 1967), examines the relationship between experience and earnings in the economics profession. Ransom (1993) and Brown and Woodbury (1998) find that, surprisingly, there is a negative effect of seniority at an institution and an economist's earnings, owing in part to the monopsony power exerted by institutions in the academic labor market. However, more recent studies find that the effect of seniority actually becomes positive once controls for the quality of research output and prior labor market mobility are included (e.g., Moore, Newman, and Turnbull, 1998; Monks and Robinson, 2001; Barbezat, 2004). Nevertheless, an analysis of economists in the U.K. indicates that the positive relationship between experience and earnings holds only for lecturers (those who specialize in teaching), but is insignificant for professors (Moore, Newman, and Turnbull, 2007). For the latter, salary is primarily determined by research productivity.

Although the effects of being a chair on salary and productivity have been understood for at least a decade, the question of who becomes a chair in economics has only recently received attention. Using a sample of 87 full and associate professors employed at economics departments in 8 large public universities (with research rankings between 30 and 75), Moore, Newman, and Turnbull (2004) investigate both the determinants and consequences of chair service. They find that the wage premium for chairs rises by 2 to 3 percent for each year of service and persists for many years after the term of service ends. In fact, it takes about a decade for the wage premium to fully dissipate. Furthermore, individuals who become chairs tend to be productive scholars, but not the most productive in their departments (in the sense of publishing most frequently in

top-tier journals). In the event that highly productive scholars are chosen as chair, they tend to already be beyond their years of peak productivity. McDowell, Singell and Stater (2009) use a sample of American Economic Association (AEA) members and find that research-specific human capital reduces the probability that an economist becomes an administrator, but that general human capital increases it. The present study therefore extends the prior literature by examining how human capital investments affect the timing of career departures into and out of department chair positions as well as into upper-level administration.

### III. Theoretical Model

In this section we describe a model of an academic's entry and exit decisions from an administrative position. The model is intentionally simple in order to focus on the influence of primary factors underlying these decisions, most notably the rate at which knowledge depreciates in a field of study. Nevertheless, the model captures two features of the process that we regard as essential: the wage increases when moving from a faculty to administrative position (Ragan and Rehman, 1996) and discipline-specific knowledge depreciates faster while encumbered with administrative responsibilities (Goodwin and Sauer, 1995).

We express the model in continuous time. The academic has an instantaneous wage function  $w(t)$  and an instantaneous utility function  $u(w(t))$  defined at each time point  $t$  between the time of entry into the profession  $t_e$  and the time of retirement  $t_r$ . Over an arbitrary interval of time  $[t_1, t_2]$  contained in  $[t_e, t_r]$ , total utility  $U$  is equal to the present value of the stream of instantaneous utilities  $u(w(t))$  earned over the interval. If the discount rate is  $r$ , then we have  $U = \int_{t_1}^{t_2} u(w(t))e^{-rt} dt$ . We further simplify by assuming that the utility function is linear and, in fact, identically equal to the wage at each point in time and that the discount rate is 0. Thus we may write:  $U = \int_{t_1}^{t_2} w(t) dt$ .

An academic, when engaged at any time in regular faculty service, the wage is assumed to be equal to the total stock of human capital accumulated over the career. Knowledge is assumed to grow at the field-specific rate  $g$  per unit time. The academic faces a decision about whether or not to become an administrator at a particular time,  $t_d$ , and if he or she enters into administration, is unable to engage in enough research time to overcome the field-specific knowledge depreciation rate  $\delta$ . It follows that the academic's knowledge only grows at the rate  $g - \delta$  per unit time while working as an administrator. The wage in administration is constant at  $w_a$ , which we assume exceeds the wage  $w_d$  earned at the time  $t_d$  of entry into administration. After leaving administration and going back into full-time research and teaching, knowledge resumes the growth rate  $g$  again, but the wage drops down to the level commensurate with the academic's stock of human capital.<sup>1</sup>

### 3.1 *The Decision to Enter Administration*

Entering administration at time  $t_d$ , quitting at time  $t_q$ , and retiring altogether from the academic profession at time  $t_r$  yields the following utility over the career interval  $[t_d, t_r]$ :

$$U_{admin} = \int_{t_d}^{t_q} w_a dt + \int_{t_q}^{t_r} (w_d + (g - \delta)(t_q - t_d) + g(t - t_q)) dt \quad (1)$$

Foregoing administration and staying on the regular faculty track for the rest of the career yields:

$$U_{non-admin} = \int_{t_d}^{t_q} (w_d + g(t - t_d)) dt + \int_{t_q}^{t_r} (w_d + g(t_q - t_d) + g(t - t_q)) dt \quad (2)$$

Administration is the better option if and only if  $U_{admin} - U_{non-admin} > 0$ , which is equivalent to:

$$\int_{t_d}^{t_q} (w_a - w_d - g(t - t_d)) dt > \int_{t_q}^{t_r} \delta(t_q - t_d) dt \quad (3)$$

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<sup>1</sup> The model could be made more complex by assuming: (1) a positive discount rate; (2) the rate of human capital accumulation diminishes over time (e.g., Ben-Porath, 1967); (3) the depreciation rate is a function of time (i.e.,  $\delta(t)$  instead of  $\delta$ ); (4) the wage  $w_a$  ( $w_d$ ) grows more quickly over time for someone with greater aptitude or interest in administrative (research) work; (4) research productivity is reduced even after the term of service ends (e.g., Goodwin and Sauer, 1995; Ragan and Rehman, 1996); (5) the wage premium for administrators extends even beyond the period of service (e.g., Moore, Newman, and Turnbull, 2004). Nevertheless, these assumptions are not introduced because they simply serve to complicate the analysis without affecting the qualitative conclusions.

This condition is illustrated graphically in Figure 1, where the term on the left is area  $A$  in the graph and the term on the right is area  $B$ . The academic decides to become an administrator if and only if area  $A$  is larger than area  $B$ .

[Insert Figure 1 here]

Even though the condition  $A > B$  holds with probability one or zero from the perspective of the individual academic, it holds with non-degenerate probability from the perspective of the researcher if the relative wage in administration ( $w_a - w_d$ ) varies in the population (e.g., because preferences and aptitudes for administrative work vary). In that case, if we let  $Admin$  be a binary variable that equals 1 if the academic decides to become an administrator and 0 otherwise, we have  $\Pr(Admin=1) = \Pr(A > B)$ . The probability of entering administration, therefore, increases whenever  $A$  increases relative to  $B$ . In order to determine the effects of model parameters on  $\Pr(Admin=1)$ , it is convenient to simplify (3) to obtain the following expression:<sup>2</sup>

$$w_a - w_d > (g/2)(t_q - t_d) + \delta(t_r - t_q) \quad (4)$$

Since  $\Pr(Admin=1)$  increases if the left-hand side of (4) increases relative to the right-hand side, the probability of entering administration (at a fixed point in time, given that one is not already an administrator) depends positively on the wage in administration  $w_a$ ; it depends negatively on the wage in usual faculty service  $w_d$ , the rate of knowledge growth  $g$ , the length of administrative service ( $t_q - t_d$ ), and the length of the post-administration career ( $t_r - t_q$ ). The rate of knowledge depreciation  $\delta$  also yields a negative effect on  $\Pr(Admin=1)$  because people in high-depreciation fields must sacrifice more human capital to serve in administration.

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<sup>2</sup> Moving from (3) to (4) requires that  $w_a > w_d + (g/2)(t_q - t_d)$ . This holds if the wage in administration exceeds not only the wage in faculty service at the time of the decision  $w_d$ , but what the faculty wage would grow into by time  $t_q$  if the academic does not choose to become an administrator. This is qualitatively consistent with empirical findings that the wage premium for administrators is substantial and persistent (e.g., Moore, Newman, and Turnbull, 2004).

### 3.2 The Decision to Exit Administration

Suppose the academic who is currently serving as an administrator has a term of service set to expire at time  $t_{q1}$ . We assume that at the time  $t_e$  of entry into the current term, the academic was earning the wage  $w_e$  in regular faculty service. If this individual decides to serve another term, he or she earns the administration wage  $w_a$  from time  $t_{q1}$  until time  $t_{q2}$ , when her pay drops down to the wage  $w_{q2,low} = w_e + (g - \delta)(t_{q2} - t_e)$  that is commensurate with his or her stock of human capital amassed as of  $t_{q2}$ . After time  $t_{q2}$ , the academic's human capital and wage will grow at the rate  $g$  until the time of retirement  $t_r$ . If, instead, this individual exits administration at the end of the current term, his or her wage at time  $t_{q1}$  will drop down to the wage  $w_{q1} = w_e + (g - \delta)(t_{q1} - t_e)$  commensurate with the human capital accumulated as of  $t_{q1}$  and will then grow at the rate  $g$  until retirement. Note that, if this option is chosen, the wage the academic will be earning in regular faculty service at the time  $t_{q2}$  when the second term in administration would have ended is  $w_{q2,high} = w_e + g(t_{q2} - t_e) - \delta(t_{q1} - t_e)$ .

Therefore, by deciding to remain in administration for a second term, the academic earns the following utility over the remaining career interval  $[t_{q1}, t_r]$ :

$$U_{stay} = \int_{t_{q1}}^{t_{q2}} w_a dt + \int_{t_{q2}}^{t_r} (w_{q2,low} + g(t - t_{q2})) dt \quad (6)$$

By deciding to exit administration at time  $t_{q1}$  and remain on the usual faculty track until retirement, total utility over the interval  $[t_{q1}, t_r]$  is:

$$U_{exit} = \int_{t_{q1}}^{t_{q2}} (w_{q1} + g(t - t_{q1})) dt + \int_{t_{q2}}^{t_r} (w_{q2,high} + g(t - t_{q2})) dt \quad (7)$$

Exiting administration is the better option if and only if  $U_{exit} - U_{stay} > 0$ , which is equivalent to:

$$\int_{t_{q2}}^{t_r} (w_{q2,high} - w_{q2,low}) dt > \int_{t_{q1}}^{t_{q2}} (w_a - w_{q1} - g(t - t_{q1})) dt \quad (8)$$

Again, this condition can be illustrated graphically. The left-hand side of (8) is represented by area  $B$  in Figure 2, while the right-hand side of (8) is area  $A$ . Therefore, letting

*Exit* be a binary variable that equals 1 if the academic exits administration at the end of the current term and 0 otherwise, we have  $\Pr(\text{Exit}=1) = \Pr(B > A)$ .

[Insert Figure 2 here]

To derive comparative static results describing how changes in model parameters affect the probability of exiting administration, we simplify (8) to the following equivalent expression:

$$\delta[(t_r - t_{q2}) - (t_{q1} - t_e)] + g[(1/2)(t_{q1} + t_{q2}) - t_e] > w_a - w_e \quad (9)$$

The probability of exiting administration increases as the left-hand side of (9) increases relative to the right-hand side. It then follows that the probability of exiting administration (at a fixed point in time, given that one has not already exited) increases in the wage at the time of entry into administration  $w_e$ , the rate of growth of knowledge  $g$ , and the length of the post-administration career  $t_r - t_{q2}$ ; it decreases in the wage available in administration  $w_a$  and the time of entry into administration  $t_e$ . The effect of the rate of knowledge depreciation  $\delta$  depends on the time  $t_{q1}$  at which the individual has the opportunity to exit. If this time is relatively early ( $t_{q1} < t_e + t_r - t_{q2}$ ), then  $\delta$  has a positive effect because people in high depreciation fields will want to exit administration to preserve as much human capital for their remaining research careers.

However, if the time of possible exit is relatively late ( $t_{q1} > t_e + t_r - t_{q2}$ ), then  $\delta$  has a negative effect because people in high depreciation fields will not have sufficient time at the end of their service to recoup their human capital losses. In other words, the model suggests that there is an interaction effect between knowledge depreciation and the time of possible exit from administration. As the exit decision point grows later, the effect of the knowledge depreciation rate on the probability of exiting administration decreases (becomes more negative).

## IV. Data and Empirical Methods

### 4.1 Data

Our analysis uses data that include the characteristics of all individuals who were a chairperson at an elite Economics department in any academic year beginning with 1948 and through 1989. The construction of these data involves several steps. First, the set of elite Economics departments is determined by use of three separate department rankings. Using the Graves, et al (1982) department rankings, a department is included in the set of elite departments if it is listed among the top-30 departments as indicated by either the total *American Economic Review* (AER)-equivalent pages published by faculty members in twenty-four top journals over the 1974-78 period (i.e., Graves, et al, 1982, Table 1) or by the pages per faculty member in the top journals (i.e., Graves, et al, 1982, Table 2). The set of elite departments also includes all departments listed by Cartter (1966) as being among the twenty-nine leading Economics departments as ranked by quality of their graduate faculty. Finally, the elite departments include all Economics departments listed among the top-30 by Hirsh, et al (1984) in which the rankings are based on the total AER-equivalent pages published by faculty members in twenty-four top journals over the 1978-83 period.

Forty-one departments met at least one of the above criteria to be classified as an elite Economics department. For each of these departments, the next step in data construction involves identifying who among the respective faculty was the department chairperson in the years 1948, 1956, 1964, 1969, 1974, 1978, 1981, 1985, and 1989. These years are selected because these are the years in which the American Economic Association (AEA) *Survey of Members* are published in the AEA Handbooks, and each Survey provides a list of the respective year's current chairperson or head at all the existing departments of Economics. In order to

identify chairpersons during the years between the Survey years, phone surveys were made to each department. The names gathered from the AEA Surveys combined with the phone surveys provided an initial set of chairpersons that included 392 individuals.

For each of the 392 individuals, career-related information was then gathered for each year of their professional career beginning with the year in which they received their PhD and through 1989 (or age 65, whichever is earlier). The information relating to demographic factors (i.e., age, nativity status, and gender) and to career development (i.e., year and institution of PhD, current institutional affiliation and, if an academic affiliation, academic rank and whether the individual holds an administrative position) are primarily collected from the various volumes of the AEA *Survey of Members* but these data are also supplemented by information provided from various other sources of biographical information (e.g., *American Men and Women of Science: The Social and Behavioral Sciences*). This detailed year-specific career-related data reveal that only 352 of the initial sample of 392 individuals were actually full-time chairpersons (e.g., not temporary, one year or less, appointments). The sample of 352 individuals includes everyone who became a full-time chairperson for the first time at one of the elite departments of Economics between the years from 1948 through 1989.

In addition to demographic and career-related data, our data also includes information concerning each individual's research activity in each year of their post-PhD career. This information relates to the number of articles published each year in academic journals, where these data are collected from various issues of the AEA *Index of Economic Articles*. The information includes the number of coauthors and journal placement, which is used to provide a weighted measure of publication activity. For coauthorship, weighted measures use the simple

1/n rule and, for an article's quality measure, the weighted measure uses as weights the journal impact factor as reported in the *SSCI Journal Citation Reports*.

Critical to our analysis is the development of a measure for the obsolescence rate associated with an individual's human capital or research-related knowledge. The first step in doing so is to classify each individual into a field of specialization or major field of research interest as indicated by their self-reported response to questionnaires used for the information reported in the various volumes of the AEA *Survey of Members*. Each individual is classified into one of eight primary fields: Theory, Growth and Development, Quantitative Methods, Monetary and/or Fiscal Policy, International, Industrial Organization, Labor, or Other, which includes all other fields.

Next, published articles are examined from a set of eight Economics journals: *American Economic Review*, *Journal of Political Economy*, *Quarterly Journal of Economics*, *Review of Economic Studies*, *Econometrica*, *Review of Economics and Statistics*, *Economica*, and the *Economic Journal*. Beginning with the respective 1989 volumes and going back to earlier volumes at 3-year intervals to 1926 (i.e., 1989, 1986, 1983, 1980 . . . 1932, 1929, 1926), all full-length articles (i.e., excluding notes and comments) from all eight journals are classified into the article's primary field of research. In more recent years, an article's primary field is classified using the *Journal of Economic Literature* and, in earlier years, by use of the *Journal of Economic Abstracts* and/or the *Index of Economic Articles*. For each article, data are collected on the ages of all citations made to the article. Then, for each year (e.g. 1989, 1986, 1983, ...), the ages of citations made to all the articles within a specific research field are grouped together across all eight journals, and the average age of all citations is determined for these field- and year-specific groupings. The average age of citations serves as our proxy for the obsolescence rate associated

with field-specific research knowledge, where more rapid obsolescence of knowledge is presumed to be associated with a lower age average of citations. Thus, we actually use the negative of the average age of citations to proxy for the rate of knowledge obsolescence (as the average age itself can be thought of as the rate of knowledge durability). For the years between our journal sample years (e.g., 1987 and 1988, 1984 and 1985, ...) a simple interpolation is made (i.e., using 1989 and 1986, 1986 and 1983, ...) to provide a measure of field-specific knowledge obsolescence that is allowed to vary continuously over time. For each individual in each year of the post-PhD career, the self-reported major field of research interest is linked to the average age of citations within the respective field, thus providing a measure for human capital obsolescence that is allowed to vary both across individuals in any given time period as well as over time for individuals within a particular field.

An important part of our analysis involves determining the extent to which the chairs in our sample from elite departments are representative of the Economics profession as a whole. To do this, we examine the characteristics that determine whether someone holds a department chair position using a different sample consisting of data on AEA members. Specifically, the additional data set we utilize is primarily drawn from the 1964, 1974, 1985, and 1989 AEA directories, where the sample includes PhD economists who work in an academic job located in the U.S. The data consist of (approximately) a 25-percent random sample of male economists appearing in each cross-section year as well as all female economists who had a PhD and were working in a tenure-track academic job located in the U.S. in any of the directory years.<sup>3</sup> From this sample, we select those individuals located at one of the 41 elite departments in the specific

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<sup>3</sup>An initial 10 percent random sample was taken from each cross-section. However, each sampled observation was followed forward and backward in time and included in the sample if found in other directories. This procedure yielded approximately a 25 percent random sample from each directory.

cross-sectional years used to construct the elite department data described above. This yields a sample consisting of 2,890 individuals.

From the AEA data, we construct a binary variable that equals one if an economist holds a department chair position in the current cross-section year, and another binary variable that equals one if the economist ever holds a department chair position during the entire period of time spanned by our data.

The data contain a number of variables that can be used to explain whether an economist currently, or ever, holds a chair position. These variables can be classified as human-capital, demographic / sociological, job-specific, or time controls. Human capital controls include a PhD quality dummy which equals 1 if and only if the publication ranking of the institution where the individual received his or her PhD is in the top 15,<sup>4</sup> the individual's age at the time of receiving the PhD, the knowledge obsolescence rate for the economist's self-reported primary research field, and the individual's contemporaneous publishing productivity<sup>5</sup> relative to the median for the other economists in the data who report themselves to be in the same research field.

Demographic and sociological variables include a dummy variable for females and a dummy variable for those born outside the U.S. Current job-specific attributes include the inverse of the department's publication ranking in the cross-sectional year and a dummy variable for those who are Assistant or Associate Professors. Finally, time controls consist of dummy variables for the 1974, 1985, and 1989 directory dates; 1964 is the excluded date.

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<sup>4</sup> The publication rankings used for the PhD institution and the current job are from Graves, Marchand, and Thompson (1982).

<sup>5</sup> Contemporaneous publishing productivity is measured as the number of articles published in the two-year window surrounding the cross-sectional year, according to listings in *Econ Lit* or the *AEA Index of Economic Articles*.

## 4.2 Empirical Methods

In this section, we describe the empirical methods used to estimate the probability of holding a chair position among those in the broader AEA sample, and the hazards of entry and exit into and out of the chair position among those in the elite department data. Recall that in the theoretical model, the decision is made to become an administrator if inequality (4) holds, i.e., if  $w_a - w_d > (g/2)(t_q - t_d) + \delta(t_r - t_q)$ . It is straightforward to derive an estimating equation for the probability of becoming an administrator if we assume a specific distribution for  $(w_a - w_d)$  conditioned on observed characteristics. Let us assume that this distribution is normal, so that we may write  $(w_a - w_d) = \mathbf{X}_1\boldsymbol{\beta}_1 - \varepsilon$ , where  $\mathbf{X}_1$  is a vector of observed covariates,  $\boldsymbol{\beta}_1$  is a vector of coefficients to be estimated, and  $\varepsilon$  is a standard normal random variable. Let us also assume that the right hand side of (4) can be expressed as  $(g/2)(t_q - t_d) + \delta(t_r - t_q) = -\mathbf{X}_2\boldsymbol{\beta}_2$ , where  $\mathbf{X}_2$  is a vector of observed covariates and  $\boldsymbol{\beta}_2$  is a vector of coefficients. Then, letting  $\mathbf{X} = [\mathbf{X}_1 \ \mathbf{X}_2]$  and  $\boldsymbol{\beta} = [\boldsymbol{\beta}_1' \ \boldsymbol{\beta}_2']'$  so that  $\mathbf{X}_1\boldsymbol{\beta}_1 + \mathbf{X}_2\boldsymbol{\beta}_2 = \mathbf{X}\boldsymbol{\beta}$ , we have:  $\Pr[\text{Admin}=1] = \Pr(\mathbf{X}_1\boldsymbol{\beta}_1 - \varepsilon > -\mathbf{X}_2\boldsymbol{\beta}_2) = \Pr(\varepsilon < \mathbf{X}\boldsymbol{\beta}) = \Phi(\mathbf{X}\boldsymbol{\beta})$ , where  $\Phi$  is the standard normal cumulative distribution function. This defines a probit model for the probability of becoming an administrator, given a suitable vector of covariates  $\mathbf{X}$  from the AEA data. In particular, our model predicts that the rate of knowledge obsolescence will have a negative effect on the probability of becoming a chair.

We can also formally derive a duration model for the timing of the entry decision because equation (4) implies that, for fixed values of the other parameters, the probability of entering administration is increasing in the time  $t_d$  at which the individual faces the decision. In fact, (4) actually implies that for each person, there is a unique earliest time at which he or she would first decide to enter administration, after having decided not to at all previous times. To make this statement precise, assume that administrative terms are fixed at the length  $T_a = t_q - t_d$  regardless

of the time of the decision to enter  $t_d$ , replace  $t_d$  with the generic time variable  $t$  so that  $T_a = T_q - t$ , and let  $t_c = (T_d/\delta)(g/2 - \delta) + t_r - (w_a - w_d)/\delta$ . Then using (4), the conditional probability of making the decision to enter administration at time  $t$ , given that the decision was made not to enter at all times  $t' < t$ , is given by:

$$\begin{aligned} & \Pr(\text{Admin}=1 \text{ at time } t \mid \text{Admin}=0 \text{ at all times } t' < t) \\ &= \Pr\{t = t_c \mid t' < t_c \text{ for all } t' < t\} = \Pr(t = t_c) / \Pr(t \leq t_c) \\ &= f(t) / (1 - F(t)), \end{aligned} \tag{5}$$

where  $f$  is the probability density function of  $t_c$ , the cutoff time at which the individual first decides with certainty to enter administration, and  $F$  is the cumulative distribution function for  $t_c$ .

The expression on the right-hand side of (5) may be recognized as  $\lambda(t)$ , the “hazard function” for the “event” of first entering administration. Thus, by assuming a particular form for the density of  $t_c$  in the population, one can obtain a “hazard model” of how the “risk” of first entering administration depends on time. A common approach in duration modeling is to assume there exists a function of time  $\alpha_0(t)$  and a constant  $\lambda > 0$  such that the density can be expressed in the form  $f(t) = \exp(-\lambda \int_0^t \alpha_0(s) ds) \lambda \alpha_0(t)$ . The resulting hazard function is then  $\lambda(t) = \lambda \alpha_0(t)$ . An empirical specification of the hazard function can be obtained by assuming that the constant  $\lambda$  and the function  $\alpha_0(t)$  vary across individuals and that for person  $i$ , we have  $\lambda_i = \exp(-\mathbf{x}_i \boldsymbol{\beta})$  for a vector of covariates  $\mathbf{x}_i$  and a vector of coefficients  $\boldsymbol{\beta}$ . Thus, the hazard function for person  $i$  is written  $\lambda_i(t) = \exp(-\mathbf{x}_i \boldsymbol{\beta}) \alpha_{0i}(t)$ , which defines the Cox proportional hazard model, with  $\alpha_{0i}(t)$  serving as the unobserved “baseline” hazard function. The Cox model has the advantage of yielding estimates of  $\boldsymbol{\beta}$  without imposing any assumptions about the precise form of the baseline hazard function. However, it assumes that the covariates do not affect the baseline hazard.

The covariates we actually use in our hazard model consist of the variables described in the discussion of the elite Economics department data: the field-specific rate of knowledge obsolescence (and its square), contemporaneous publications, age (and age squared), the Assistant / Associate Professor dummy, the top-15 PhD dummy, the foreign-born dummy, the dummy variables for the decades of the 60s, 70s, and 80s, and department fixed effects. We expect that the rate of knowledge obsolescence will have a negative effect on the hazard of entry into the chair position.

A hazard model for the timing of exit from administration can also be developed in a similar fashion, although the direction of duration dependence is less straightforward than for the entry decision.<sup>6</sup> We expect, based on theory, that the rate of knowledge obsolescence will have a positive effect on the hazard of exiting the chair position.

## V. Results

In this section we present the estimates of four sets of equations: (i) a probit model for the probability that an economist is observed to be a chair in the cross-sectional *AEA* data, (ii) a hazard model for the number of years it takes to first become a chair, (iii) a hazard model for the number of years it takes to exit a chair position, and (iv) probit models for the choice of different possible post-chair career paths (i.e., a return to normal faculty service or a movement to higher

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<sup>6</sup> The nature of the relationship between time and the net utility of exit depends on model parameters. In particular, if  $g < 2\delta$ , then there is no earliest time at which exit will be the preferred option; the economist will exit at the earliest possible time. If he or she is not observed to exit at any earlier time, the conditional probability of exit at any given time is zero. Additional assumptions are then required to develop a well-defined hazard model for the exit outcome. Some possibilities are: (1) the economist does not have complete control over the quitting time (i.e., there is a period during which exit is not an option); (2) the wage in administration and/or the length of the second term vary with time in such a way that there is a unique earliest time where exit is preferred; and (3) some economists have  $g > 2\delta$ , and the hazard model arises from the exit decisions of these individuals. Further details of the derivations in these scenarios are available from the authors upon request.

levels of administration).<sup>7</sup> Throughout our analysis, we try to maintain a consistent model specification, in that we control for essentially the same set of variables in all the regressions.

### *5.1 Probability of Holding the Chair Position*

Table 1 presents cross-sectional estimates of the probability of ever occupying a chair position during one's career and for the probability of currently serving as chair, based on the AEA data. The AEA data consist of 2,890 individuals, which is the number of observations for the model of ever serving as chair (first three columns of results). For the model of currently serving as chair (fourth through sixth columns), we exclude all who were chairs in a previous time period and all who became chair in a later time period, leaving 2,190 observations.

The results in the first column indicate that economists in fields of study where knowledge depreciates more rapidly are less likely to ever occupy the position of chair during their careers. Economists who are highly productive in research relative to others in their field are also less likely to ever be chairs. The data reveal a time trend away from chair service, as economists appearing in later cohorts of the data are less likely to ever occupy a chair position than those in earlier cohorts.

*[Insert Table 1 here]*

Including additional personal and departmental controls (columns 2 and 3) does not qualitatively affect these results, although the effect of knowledge depreciation becomes smaller in magnitude. Furthermore, economists who never reach the rank of full professor, those who are from top-15 PhD programs, those who are foreign born, and those who are female are all significantly less likely to ever hold a chair position.

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<sup>7</sup> Descriptive statistics for the variables used in all of our models are presented in a series of Appendix tables, which are arranged in the same order as the tables of regression results (presented in the text below) to which they correspond. For brevity, we refrain from discussing the descriptive statistics.

The next three columns of the table contain the results for the probability of currently serving as chair. These results tell largely the same story as those for chair service at any point in the career: knowledge depreciation, research productivity relative to one's field, and time all reduce the likelihood that the economist is currently observed to occupy the chair position. The effect of knowledge depreciation is insignificant (although still negative in sign) when the additional controls are included, but becomes significant again with the inclusion of the fixed effects. Age significantly increases the probability of currently serving as chair, albeit at a diminishing rate. Those ranked below full professor are less likely to currently be observed in a chair position, as are the foreign-born. The rank of the current department and the PhD program do not significantly affect whether one is currently chair.

It follows from these results that our sample of chairs in top departments will be more heavily weighted than our sample of AEA members toward economists in low-depreciation fields, those with relatively low research productivity,<sup>8</sup> those from earlier time periods, full professors, those from top PhD programs, those born in the U.S., and men. Nonetheless, since these departments likely have a disproportionate influence on the broader culture of economics, our results should be instructive concerning leadership in the profession as a whole.

### *5.2 Hazard of Entry into the Chair Position*

The Cox proportional hazard estimates of the timing of entry into the chair position, based on the elite department data, are presented in Table 2. The sample for these regressions consists of the 352 individuals who ever became chair (for the first time) during the sample time horizon, along with 42 individuals who never became chair, for a total of 394 observations.

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<sup>8</sup> But the fact that they are all from top departments may more than offset this tendency in the data.

In the first column we control only for knowledge depreciation (and its square) and contemporaneous publishing productivity. These results indicate that knowledge depreciation reduces the hazard of becoming chair (implying slower progress over time into the chair position) but at a diminishing rate. However, publishing productivity has no effect. The results for the knowledge depreciation controls are virtually identical when we expand the controls to include age, academic rank, PhD program rank, and nativity. However, publishing productivity now has a significant negative effect on the hazard of becoming chair. The economist's age increases the hazard of entry into the chair position (at a diminishing rate), while those ranked below full professor experience lower hazards of becoming chair than the most senior members of the profession. PhD program rank and foreign-born status have insignificant effects on the hazard of becoming chair.

*[Insert Table 2 here]*

When departmental fixed effects are included, the results are virtually unaltered, except that the effect of knowledge depreciation in the field becomes smaller in magnitude (although it remains negative and significant). However, the effect of personal publishing productivity becomes stronger and more significant. The final column of the table includes decade controls, but these are insignificant and do not have a noticeable effect on any of the other results.

### *5.3 Hazard of Exit from Chair Position*

In Table 3 we present the hazard estimates pertaining to exit from the chair position. The sample for these regressions consists only of the 352 individuals who ever became chair. When we control only for knowledge depreciation and research productivity (first column), we find that knowledge depreciation negatively effects the hazard of exiting as chair, and at an increasing rate. This result is somewhat surprising because a higher rate of knowledge depreciation would

seem to suggest a higher opportunity cost (in terms of foregone research output) of continued service as chair. It may be that, for the typical chair, the first realistic opportunity to step down is sufficiently late in the career that a return to a highly productive research career is problematic, particularly for those whose knowledge has depreciated quickly during their terms as chair. Alternatively, it may be that scholars in high-depreciation fields who serve as chair are doing so as part of a permanent movement into administration, since it is difficult for them to return to move back to a full-time research track. We investigate this possibility in the next section. A final possibility is that the negative effect of depreciation is an artifact of the conditional nature of the hazard function. Recall that according to the theoretical model, as the length of time spent in administration increases (relative to the length of the post-administration career), the effect of the knowledge depreciation rate on the probability of exiting administration decreases (becomes more negative) because too much human capital has been sacrificed for post-administration research career to be viable. Thus, given that one has not yet exited the chair position at a given point in time, the more that a higher depreciation rate tends to make the person want to remain in the administrative position. In other words, administration could potentially become an absorbing state, which is reflected in the hazard function.

*[Insert Table 3 here]*

We also find in the first column of results that those with more contemporaneous publications have a higher hazard of exiting as chairs. This result is expected, since more productive scholars should have higher opportunity costs of continued administrative service. When we add personal and departmental controls (columns 2 and 3), the results for knowledge depreciation and research productivity are virtually unchanged. Chairs who were older when their terms of service began have a higher hazard of exiting the position, although this effect

becomes insignificant when department fixed effects are added. Academic rank, PhD program quality, and foreign-born status all have insignificant effects on the hazard of exit.

Columns 4 and 5 of the table show the results when decade controls are added. Those serving as chair during the 60s, 70s, and 80s all have higher hazards of exit than those serving during earlier decades, suggesting a move to shorter terms of chair service over time. This is consistent with a growing emphasis on research and the increasingly specialized nature of the discipline, both of which raise the opportunity cost of time spent in administration. Interestingly, when the decade controls are added, the effect of knowledge depreciation becomes insignificant, and the only variable in the equation that has a significant effect (other than the decade controls themselves) is research output. However, when the quadratic knowledge depreciation term is omitted from the specification (column 5), the linear term is once again negative and significant.

#### *5.4 Post-Chair Career Paths*

Finally, in Table 4 we examine the determinants of career paths chosen by economists after their exits from the chair position. The sample for these regressions consists of the 352 individuals who were observed to become chair for the first time during the course of our sample period, plus 62 individuals who were observed to become chair for the second time during this span. From the group of second-time chairs, we exclude the 9 individuals who retired immediately after their second terms ended, yielding a sample size of 405 for these regressions.

The first two columns present probit model estimates for the probability that the economist immediately returns to a normal faculty track after stepping down as chair. These results indicate that those who publish more during their chair terms and those who are older at the end of their terms are more likely to return directly to the faculty. These results are as expected because more productive researchers have a higher opportunity cost of continued

administrative service, while older academics likely receive a lower benefit from taking on time-consuming administrative roles that may have lengthy service commitments. The rest of the controls, including knowledge depreciation, academic rank at the end of the chair term, PhD program quality, foreign-born status, and the decade in which the chair term ends all have insignificant effects on the probability of immediately returning to the faculty.

*[Insert Table 4 here]*

In the next three columns we investigate the determinants of the decision to move into another administrative position at some point after completing the chair term. The third column presents the estimates for the probability of making a subsequent move into administration (either at the chair level or something higher such as Dean or Provost), either immediately upon exiting the chair position or in a subsequent future year within our sample years. The results indicate that, for those completing their chair service, the rate at which knowledge becomes obsolete in the research field has a positive (and increasing) effect on the probability of making a subsequent move into administration. This may be because those in high-depreciation fields have already greatly reduced their research trajectories while serving as chair, so that remaining in or returning in the future to administration becomes more attractive relative to returning to normal faculty duties. This result may also help explain why, as noted earlier, economists in faster-depreciation fields have lower hazards of exit from chair positions.

Those who are older when their chair term ends are less likely to serve again as administrators after finishing as chair, as are those who are foreign-born and those with chair terms ending in the 1980s or later. The latter result may reflect the increasing opportunity costs of administrative careers as the discipline becomes more research-oriented over time.

The final two columns of Table 4 contain the results for the probability of moving to a higher level of administration subsequent to completing a term as chair. The rate of knowledge depreciation has a positive and increasing effect, as it did for the outcome of remaining in some kind of administrative capacity. This sheds additional light on the negative effect of knowledge depreciation on the hazard of exit from chair – at least some of the time, those from high-depreciation fields may remain as chairs because they eventually plan to move into a higher level of administration. Those who are more productive researchers during their chair terms are less likely to later move into higher administrative positions, consistent with the higher opportunity costs they face of engaging in ever-more demanding service responsibilities. Those who are older when their chair terms end are less likely to move up to a higher level of administration, and those with chair terms ending in the 1960s are more likely to move to a higher level. The latter result may illustrate a greater aversion to high administrative service as the research component of the economics profession becomes more demanding.

Finally, in the last column of the table we add a dummy variable for those who are completing their second term as chair. This variable has no noticeable effect on any of the other results, but is itself positive and significant, indicating that those completing their second terms are more likely to move up to higher administrative positions. This finding is consistent with expectations because part of the reason why these individuals agreed to serve second terms may have been to position themselves for future promotions to the upper echelons of administration.

## **VI. Conclusion**

This paper examines the general question of what makes a leader using data on individual economists who have served as department chairs at top research institutions in the postwar era. The analysis exploits the unique attributes of the academic market in which there is a well-

defined and common job hierarchy, a publicly documented output that is relatively easy to observe and measure over a career, and where comparably trained individuals are observed to face different human-capital depreciation rates. In other words, the academy provides the necessary conditions to test the broad expectation that the attributes and early-career experiences of workers determine their subsequent management opportunities. Our findings, nonetheless, generalize to most professional organizations that are hierarchal in nature and promote workers through the ranks from positions where the skills necessary to perform entry-level jobs would depreciate in absence of regular investments (e.g., law, architecture, and engineering firms).

The empirical analysis specifically examines the factors that determine: (1) the probability of becoming chair among all economists employed at these top institutions; (2) the duration period for entry into and exit from the chair position for those faculty who serve as chair; (3) the probability of returning to the faculty and moving into higher administration once an economist has served as chair. Broadly, our results suggest that the rate at which knowledge depreciates not only reduces the hazard of entry into an administrative position, but also reduces the hazard of exit from the position for those who are already serving. Thus, while the prospect of sacrificing a large amount of human capital is a deterrent to entering administrative service, there is also particularly high inertia in administration for persons working in high-depreciation fields. We also find that the most-productive economists (in terms of research) have lower hazards of entering administration, but higher hazards of exiting. However, we also find that, once a person has entered the administrative track, a higher depreciation rate increases the likelihood that the individual stays in the administrative track and moves into upper-level administration. Thus, management can be an absorbing state. These results support the prediction of our theoretical model that workers trade off higher wages in administrative careers for lower

human capital accumulation such that they are less likely to choose management careers as the opportunity costs increase.

Overall, these findings indicate that leaders are, to a large extent, made and not born. On the individual level, this is important because it suggests that opportunities and choices early in a career directly affect a person's subsequent ability to move into a managerial position. Whether such early choices are made with a full understanding of the long-term career implications is not fully understood. These findings also have broader aggregate implications because they suggest that changes in a profession over time can affect who among the potential pool of applicants select into management and at what stage of their career they do so. In this particular case, our model predicts that the growing specialization and technical nature of the economics profession should lead to less research active and older economists selecting into administrative areas and that, once in, these administrators should be less likely to return to the faculty. Such changes have also likely occurred to a lesser or greater extent in other professions, which could yield significant general equilibrium changes in administrative structure within a university or similarly situated professional organizations that have not yet been studied. Thus, further work is needed to understand the individual and aggregate dynamics of leadership determination, because the value of good leadership has certainly not diminished over time, particularly given the current economic conditions.

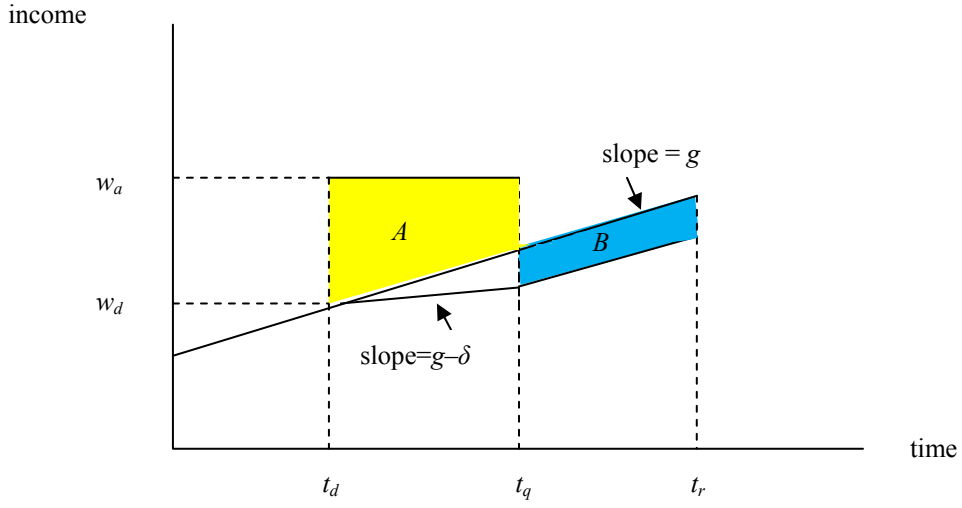
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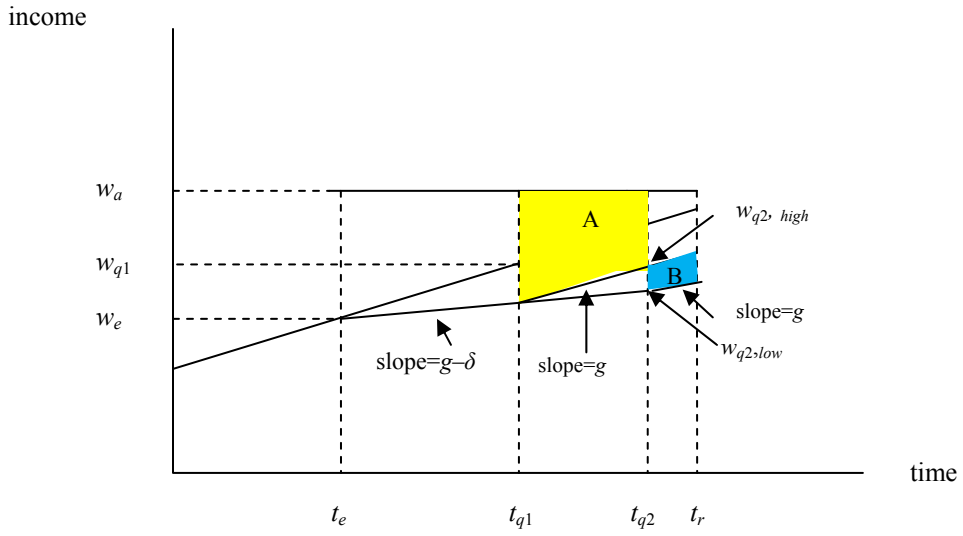
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**Figure 1: The Decision to Enter Administration**



**Figure 2: The Decision to Exit Administration**



**Table 1 Factors Associated With Being a Department Chair: Cross-Section Data With Probit Model Parameter Estimations (standard errors in parentheses)**

Variables	Chair During the Career			Current Chair <sup>a</sup>		
	(1)	(2)	(3)	(1)	(2)	(3)
Field-Specific Obsolescence	-0.047*** (0.013)	-0.028** (0.012)	-0.025** (0.012)	-0.014* (0.008)	-0.005 (0.003)	-0.005* (0.003)
Relative Field Publications	-0.019*** (0.005)	-0.018*** (0.005)	-0.020*** (0.005)	-0.011*** (0.004)	-0.004** (0.002)	-0.003** (0.002)
Year 1974	-0.126*** (0.025)	-0.114*** (0.022)	-0.105*** (0.023)	-0.050*** (0.013)	-0.016*** (0.006)	-0.012*** (0.005)
Year 1985	-0.200*** (0.025)	-0.201*** (0.021)	-0.197*** (0.022)	-0.062*** (0.014)	-0.027*** (0.007)	-0.022*** (0.006)
Year 1989	-0.231*** (0.024)	-0.216*** (0.021)	-0.211*** (0.022)	-0.071*** (0.015)	-0.031*** (0.007)	-0.025*** (0.006)
Age	....	....	....	....	0.008*** (0.002)	0.007*** (0.002)
Age <sup>2</sup>	....	....	....	....	-0.000*** (0.000)	-0.000*** (0.000)
Not Full Professor	....	-0.292*** (0.016)	-0.294*** (0.017)	....	-0.073*** (0.014)	-0.064*** (0.013)
Top-15 PhD Program	....	-0.036** (0.018)	-0.036* (0.019)	....	-0.001 (0.005)	0.004 (0.004)
Foreign Born	....	-0.271*** (0.015)	-0.277*** (0.015)	....	-0.056*** (0.008)	-0.046*** (0.008)
Female <sup>b</sup>	....	-0.273*** (0.011)	-0.262*** (0.011)	....	....	....
Relative Department Rank	....	....	1.133 (0.969)	....	....	-0.057 (0.218)
Fixed Department Controls	No	No	Yes	No	No	Yes
Observations	2890	2890	2890	2169	2169	2169
Log Likelihood	-1736.07	-1313.45	-1260.87	-571.80	-419.26	-394.80

Notes:

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

<sup>a</sup> The sample excludes all individuals who were a Chair in a previous time period as well as all individuals who became a Chair in some future time period.

<sup>b</sup> The Female control is excluded from the Current Chair model specification because its inclusion would perfectly predict failure.

**Table 2 Factors Associated With the Timing of Becoming a Department Chair for the First Time: Panel Data Hazard Model Parameter Estimations (standard errors in parentheses)**

<b>Variable</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
<b>Field-Specific Obsolescence</b>	<b>- 1.004***</b> (0.409)	<b>- 1.109***</b> (0.416)	<b>- 0.863**</b> (0.429)	<b>- 0.916**</b> (0.467)
<b>Field-Specific Obsolescence<sup>2</sup></b>	<b>- 0.061***</b> (0.025)	<b>- 0.068***</b> (0.025)	<b>- 0.054**</b> (0.026)	<b>- 0.057**</b> (0.028)
<b>Contemporaneous Publications</b>	<b>- 0.067</b> (0.041)	<b>- 0.072*</b> (0.042)	<b>- 0.088**</b> (0.044)	<b>- 0.087**</b> (0.045)
<b>Age</b>	....	<b>0.528***</b> (0.123)	<b>0.562***</b> (0.126)	<b>0.533***</b> (0.126)
<b>Age<sup>2</sup></b>	....	<b>- 0.006***</b> (0.001)	<b>- 0.006***</b> (0.001)	<b>- 0.006***</b> (0.001)
<b>Not Full Professor</b>	....	<b>- 0.410***</b> (0.153)	<b>-0.369**</b> (0.161)	<b>- 0.359**</b> (0.164)
<b>Top-15 PhD Program</b>	....	<b>0.090</b> (0.115)	<b>0.146</b> (0.127)	<b>0.125</b> (0.129)
<b>Foreign Born</b>	....	<b>- 0.244</b> (0.151)	<b>- 0.227</b> (0.166)	<b>- 0.210</b> (0.166)
<b>Decade of the 1980s</b>	....	....	....	<b>0.293</b> (0.182)
<b>Decade of the 1970s</b>	....	....	....	<b>- 0.151</b> (0.178)
<b>Decade of the 1960s</b>	....	....	....	<b>- 0.233</b> (0.163)
<b>Fixed Department Controls</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>
<b>Number Individuals</b>	<b>394</b>	<b>394</b>	<b>394</b>	<b>394</b>
<b>Total Observations</b>	<b>12,090</b>	<b>12,090</b>	<b>12,090</b>	<b>12,090</b>
<b>Log Likelihood</b>	<b>-1823.75</b>	<b>-1807.12</b>	<b>-1770.47</b>	<b>-1765.46</b>

Notes:

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 3 Factors Associated With the Length of Time Before Exiting the Chair Position: Panel Data Hazard Model Parameter Estimations (standard errors in parentheses)**

<b>Variable</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
<b>Field-Specific Obsolescence</b>	<b>- 1.740***</b> (0.626)	<b>- 1.627**</b> (0.629)	<b>- 1.880***</b> (0.672)	<b>- 0.732</b> (0.710)	<b>- 0.136*</b> (0.072)
<b>Field-Specific Obsolescence<sup>2</sup></b>	<b>- 0.105***</b> (0.039)	<b>- 0.098**</b> (0.039)	<b>- 0.113***</b> (0.042)	<b>- 0.037</b> (0.044)	....
<b>Contemporaneous Publications</b>	<b>0.093**</b> (0.045)	<b>0.092**</b> (0.045)	<b>0.093*</b> (0.048)	<b>0.080*</b> (0.048)	<b>0.080*</b> (0.048)
<b>Age At Chair Appointment</b>	....	<b>0.017*</b> (0.009)	<b>0.008</b> (0.011)	<b>0.005</b> (0.011)	<b>0.005</b> (0.011)
<b>Not Full Professor</b>	....	<b>-0.108</b> (0.226)	<b>- 0.086</b> (0.240)	<b>0.123</b> (0.246)	<b>0.123</b> (0.247)
<b>Top-15 PhD Program</b>	....	<b>0.158</b> (0.126)	<b>-0.052</b> (0.153)	<b>-0.075</b> (0.156)	<b>-0.085</b> (0.156)
<b>Foreign Born</b>	....	<b>0.048</b> (0.165)	<b>- 0.164</b> (0.186)	<b>- 0.227</b> (0.190)	<b>-0.219</b> (0.190)
<b>Decade of the 1980s</b>	....	....	....	<b>1.233***</b> (0.212)	<b>1.253***</b> (0.212)
<b>Decade of the 1970s</b>	....	....	....	<b>1.151***</b> (0.214)	<b>1.213***</b> (0.203)
<b>Decade of the 1960s</b>	....	....	....	<b>1.161***</b> (0.213)	<b>1.218***</b> (0.204)
<b>Fixed Department Controls</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Number Individuals</b>	<b>352</b>	<b>352</b>	<b>352</b>	<b>352</b>	<b>352</b>
<b>Total Observations</b>	<b>5678</b>	<b>5678</b>	<b>5678</b>	<b>5678</b>	<b>5678</b>
<b>Log Likelihood</b>	<b>-1442.33</b>	<b>-1439.55</b>	<b>-1411.72</b>	<b>-1386.16</b>	<b>-1386.53</b>

Notes:

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 4 Factors Associated With Academic Position After Exiting the Chair Position: Cross-Section Data With Probit Model Parameter Estimations (standard errors in parentheses)**

	Immediate Return to Faculty		Subsequent Movement into Another Administrative Position		
			Same or Higher Level	Higher Level	Higher Level
	(1)	(2)	(1)	(1)	(2)
Field-Specific Obsolescence	-0.234 (0.146)	-0.147 (0.146)	0.777*** (0.294)	0.300** (0.146)	0.300** (0.136)
Field-Specific Obsolescence <sup>2</sup>	-0.014 (0.009)	-0.009 (0.009)	0.045*** (0.018)	0.018** (0.009)	0.018** (0.008)
Publications During Chair Term	0.051** (0.023)	0.040* (0.022)	-0.004 (0.035)	-0.038* (0.021)	-0.039** (0.020)
Age At the End of Chair Tenure	0.003* (0.002)	0.003* (0.002)	-0.020*** (0.004)	-0.005*** (0.002)	-0.007*** (0.002)
Not Full Professor at the End	0.020 (0.041)	0.024 (0.037)	-0.058 (0.082)	-0.016 (0.042)	0.007 (0.050)
Top-15 PhD Program	0.026 (0.032)	0.017 (0.030)	0.008 (0.056)	-0.014 (0.031)	-0.014 (0.029)
Foreign Born	-0.010 (0.043)	-0.010 (0.043)	-0.115* (0.060)	-0.003 (0.041)	0.007 (0.041)
Chair Tenure Ends After 1980	....	0.056 (0.037)	-0.282*** (0.061)	-0.032 (0.042)	-0.019 (0.042)
Chair Tenure Ends in the 1970s	....	0.012 (0.039)	-0.120 (0.067)	0.027 (0.054)	0.037 (0.055)
Chair Tenure Ends in the 1960s	....	-0.017 (0.045)	0.002 (0.081)	0.103* (0.068)	0.133** (0.075)
Second Term as Chair	....	....	....	....	0.209*** (0.083)
Fixed Department Controls	Yes	Yes	Yes	Yes	Yes
Number Observations	405	405	405	405	445
Log Likelihood	-119.68	-117.54	-176.36	-119.40	-113.15

Notes:

\*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Appendix Table A: Descriptive Statistics for Table 1**

<b>Dependent Variables</b>	<b>Chair During the Career</b>		<b>Current Chair</b>	
	<b>Mean</b>	<b>Std. Dev.</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Past, Current, or Future Chair</b>	<b>0.306</b>	<b>0.461</b>	<b>.....</b>	<b>.....</b>
<b>Current Chair</b>	<b>.....</b>	<b>.....</b>	<b>0.077</b>	<b>0.266</b>
<b>Independent Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Field-Specific Obsolescence</b>	<b>-7.911</b>	<b>0.834</b>	<b>-7.920</b>	<b>0.835</b>
<b>Relative Field Publications</b>	<b>1.002</b>	<b>1.796</b>	<b>1.046</b>	<b>1.933</b>
<b>Year 1974</b>	<b>0.263</b>	<b>0.440</b>	<b>0.251</b>	<b>0.434</b>
<b>Year 1985</b>	<b>0.275</b>	<b>0.447</b>	<b>0.286</b>	<b>0.452</b>
<b>Year 1989</b>	<b>0.296</b>	<b>0.456</b>	<b>0.319</b>	<b>0.466</b>
<b>Age</b>	<b>.....</b>	<b>.....</b>	<b>41.256</b>	<b>9.495</b>
<b>Not Full Professor</b>	<b>0.460</b>	<b>0.498</b>	<b>0.537</b>	<b>0.499</b>
<b>Top-15 PhD Program</b>	<b>0.663</b>	<b>0.473</b>	<b>0.375</b>	<b>0.485</b>
<b>Foreign Born</b>	<b>0.314</b>	<b>0.464</b>	<b>0.375</b>	<b>0.484</b>
<b>Female</b>	<b>0.108</b>	<b>0.310</b>	<b>0.142</b>	<b>0.350</b>
<b>Relative Department Rank</b>	<b>0.028</b>	<b>0.0255</b>	<b>0.028</b>	<b>0.025</b>
<b>Observations</b>	<b>2890</b>		<b>2169</b>	

**Appendix Table B: Descriptive Statistics for Tables 2 and 3**

<b>Independent Variables</b>	<b>Table 2</b>		<b>Table 3</b>	
	<b>Time to Becoming Chair</b>		<b>Time to Exit Chair Position</b>	
	<b>Mean</b>	<b>Std. Dev.</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Field-Specific Obsolescence</b>	<b>-7.916</b>	<b>1.207</b>	<b>-7.942</b>	<b>1.012</b>
<b>Contemporaneous Publications</b>	<b>0.653</b>	<b>1.367</b>	<b>0.490</b>	<b>1.176</b>
<b>Age</b>	<b>44.176</b>	<b>10.514</b>	<b>.....</b>	<b>.....</b>
<b>Age At Chair Appointment</b>	<b>.....</b>	<b>.....</b>	<b>42.285</b>	<b>6.674</b>
<b>Not Full Professor</b>	<b>0.372</b>	<b>0.483</b>	<b>0.085</b>	<b>0.278</b>
<b>Top-15 PhD Program</b>	<b>0.628</b>	<b>0.483</b>	<b>0.629</b>	<b>0.483</b>
<b>Foreign Born</b>	<b>0.164</b>	<b>0.370</b>	<b>0.151</b>	<b>0.358</b>
<b>Decade of the 1980s</b>	<b>0.215</b>	<b>0.411</b>	<b>0.335</b>	<b>0.472</b>
<b>Decade of the 1970s</b>	<b>0.255</b>	<b>0.436</b>	<b>0.287</b>	<b>0.452</b>
<b>Decade of the 1960s</b>	<b>0.219</b>	<b>0.413</b>	<b>0.191</b>	<b>0.393</b>
<b>Number Individuals</b>	<b>394</b>		<b>352</b>	
<b>Total Observations</b>	<b>12090</b>		<b>5678</b>	

**Appendix Table C: Descriptive Statistics for Table 4**

<b>Dependent Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Immediate Return to Faculty</b>	<b>0.889</b>	<b>0.315</b>
<b>Subsequent Move to Another Administrative Position</b>	<b>0.294</b>	<b>0.461</b>
<b>Subsequent Move to A Higher Administrative Position</b>	<b>0.131</b>	<b>0.338</b>
<b>Independent Variables</b>	<b>Mean</b>	<b>Std. Dev.</b>
<b>Field-Specific Obsolescence (Average During Tenure)</b>	<b>-7.954</b>	<b>0.925</b>
<b>Publications During Chair Term (Per Year of Tenure)</b>	<b>0.804</b>	<b>0.784</b>
<b>Age At the End of Chair Tenure</b>	<b>49.951</b>	<b>7.647</b>
<b>Not Full Professor at the End</b>	<b>0.079</b>	<b>0.270</b>
<b>Top-15 PhD Program</b>	<b>0.647</b>	<b>0.479</b>
<b>Foreign Born</b>	<b>0.136</b>	<b>0.343</b>
<b>Chair Tenure Ends After 1980</b>	<b>0.353</b>	<b>0.479</b>
<b>Chair Tenure Ends in the 1970s</b>	<b>0.235</b>	<b>0.424</b>
<b>Chair Tenure Ends in the 1960s</b>	<b>0.249</b>	<b>0.433</b>
<b>Second Term as Chair</b>	<b>0.151</b>	<b>0.358</b>
<b>Number Observations</b>	<b>405</b>	