Academic Tenure and Mandatory Retirement Under the New Law

Walter Y. Oi

Summary. Federal abrogation of the age-based mandatory retirement provisions in existing academic tenure contracts calls for a review of tenure and salary policies. Here two alternative explanations for the institution of tenure are examined. Then five alternative policy responses that might be adopted by university administrations are described and analyzed. The proposal favored by the author consists of a two-track salary plan in which a distinction is drawn between tenure and employment.

With the passage of Public Law 95-256 (the 1978 amendments to the Age Discrimination and Employment Act of 1967), the federal government has abrogated the mandatory retirement clauses that were agreed upon by employer and employees in many privately determined employment contracts. As of 1 July 1982, it will be illegal to require retirement on grounds of age before the age of 70; legislation is now being prepared by Representative Claude Pepper (D-Fla.) which would outlaw the use of any age as a criterion for involuntary retirement.

The new law obviously redounds to the benefit of college professors and salaried executives who will be reaching the age of 65 in the 1980's. Some 65-year-old professors are sure to exercise the newly created rights by postponing retirement. Some university administrators are disturbed by this prospect, but few have studied the quantitative implications of the law. The consequences of inaction are clear: costs will climb, and the quality of higher education will deteriorate.

Academic tenure was never intended to guarantee employment for life. It was designed to protect academic freedom and to provide economic security for a time span covering the probable productive lifetime of the typical scholar. Chronological age offered a convenient criterion for terminating the tenure contract at or near the end of the scholar's productive lifetime. Under PL 95-256, universities will be forced to use other means to limit the term of employment. In a world of declining enrollments and tight budgets, university administrators will be hard-pressed to maintain the quality of teaching and research in their institutions. Their task has been made harder by the 1978 law.

The author is the Elmer B. Milliman Professor and chairman of the Department of Economics at the University of Rochester, Rochester, New York 14627.

Rationales for Academic Tenure

The traditional justifications for academic tenure are nicely summarized in the following excerpt from the statement of principles of the American Association of University Professors (*1*):

> Institutions of higher education are conducted for the common good and not to further the interest of either the individual teacher or the institution as a whole. The common good depends upon the free search for truth and its free exposition. Academic freedom is essential to these purposes and applies to both teaching and research. Tenure is a means to certain ends, specifically (1) freedom of teaching and of research and of extra-mural activities, and (2) a sufficient degree of economic security to make the profession attractive to men and women of ability. Freedom and economic security, hence tenure, are indispensable to the success of an institution in fulfilling its obligations to its students and to society.

In this view, tenure protects the academic freedom of the faculty by providing immunity from pressures for intellectual conformity. However, tenure must be tied to a salary policy which can guarantee the "economic security" needed to attract men and women of ability into what Brewster (*2*) calls "underpaid academic life."

The costs of tenure are also recognized. First, mistakes are unavoidable, and universities will grant unlimited tenure to some undeserving persons. Second, tenure entails an opportunity cost, which is nicely described by Brewster (*2*): "Every slot mortgaged for a full professor's lifetime blocks the hope for advancement for some promising members of on-coming generations."

A very different explanation for academic tenure is one proposed by Alchian (*3*). In his model, risk-averse faculty demand tenure for its obvious economic advantages, and universities supply tenure because it appears to be the least costly means of attracting and retaining qualified professors.

Freeman (*4*) has developed a simple analytic model in which tenure and an implicit, one-sided salary policy are features of an equilibrium contractual arrangement in a world characterized by (i) symmetrical ignorance about the innate productivity of individuals, (ii) risk aversion on the part of faculty members, and (iii) competition among many university employers. The main results can be derived from a simple model with two kinds of individuals and two time periods (*5*).

Suppose that two kinds of individuals enter the academic labor market. The Alphas are innately more productive and have a higher probability of making an important scholarly contribution or discovery than the Betas. Neither university employers nor new faculty are able to determine just who is an Alpha and who a Beta. As a consequence, all newly hired faculty are paid the same starting salary, equal to the value of the expected productivity $\overline{W}$ of the entire entering group.

During their first term of employment individuals engage in research, and some make important scholarly contributions. Although the Alphas are more likely to become members of this successful S group, the stochastic nature of academic research assures that some successful people will come from the Betas. Given the luck of the draw, some Alphas will end up in the group of failures F.

Individuals who succeed by making important discoveries realize that they are, on average, more productive than their peers. Universities also recognize that the S group will have a higher fraction of the more productive Alphas and will hence be more productive in the second period. They compete for the successes by offering them higher wages W_S. In a truly competitive market the salaries of the failure group W_F would be

0036-8075/79/1221-1373$01.50/0

adjusted downward, $W_F < \overline{W}$, to reflect their lower productivity. The sorting of professors into successes S and failures F generates salary differentials in the second period, $W_F < \overline{W} < W_S$. Starting salaries $\overline{W}$ and second-period salaries are equated to their respective expected productivities, and university-firms earn zero profits. But the market equilibrium will differ from this scenario when faculty members are risk-averse.

Payment equal to expected productivity must lead to uncertain income streams, with failures suffering pay cuts in the second period. A risk-averse individual would prefer an income-insurance scheme in which he gives up some income in the first period in return for a contract that gives him a stable income in the contingent event that he fails to make a discovery. The premium for this policy is financed by underpaying junior faculty, who get a starting salary that is below their expected product, $W_0 < \overline{W}$. Competition will force universities to pay successes a higher salary W_S which is equal to their higher expected product. The failures are, however, protected by the implicit income-insurance scheme and receive a stable income stream even though this exceeds their expected product, $W_0 > W_F$. Some arrangement must be made to guarantee that the university will honor these implicit income-insurance schemes. Tenure offers one such arrangement.

This simple model provides us with an alternative explanation for the academic tenure contract with its implicit no-cut salary policy. The narrow dispersion of starting salaries which occurs is consistent with symmetrical ignorance about individual productivities and payment of an implicit premium for income insurance. As evidence on research and teaching is accumulated, universities must pay higher salaries to retain the more productive scholars. Since the failures continue to get W_0 (which exceeds their expected product W_F), we find that both the mean and the dispersion of academic salaries increase with increasing age. The salary data at Rochester and at other major universities tend to confirm these implications of the Freeman model (*6*).

The Value of Academic Tenure

In a competitive labor market the cost of tenure with its job security and no-cut salary policy must be borne by an underpaid junior faculty. The main beneficiaries of this scheme are the less productive senior faculty whose stable second-period salaries W_0 exceed their expected product W_F (*7*). If the second period can be shortened, the "premium costs" can be lowered, meaning higher starting salaries. The new law prolongs the second period.

During the years of rapid growth, 1945 to 1967, universities behaved as if there were a cartel agreement that compelled them to make tenure decisions by the sixth or seventh year. In the last decade several universities, including Rochester, have extended this probationary period so that an individual can be retained on a nontenured appointment for up to 11 years. The main advantage claimed for this change is that it gives individuals sufficient time to develop and demonstrate their full scholarly potential. The university will presumably benefit by making fewer mistakes. Delaying the tenure decision must, however, increase the uncertainty facing nontenured faculty members. If academics are truly risk-averse, the greater uncertainties due to longer probationary periods must be accompanied by higher pay in order to attract the same quality and quantity of new assistant professors.

The implicit assurance in academic tenure that nominal salaries will not be cut had considerable economic value when consumer prices were reasonably stable, as they were from 1950 to 1970. Over the 5 years from 1972 to 1977, the consumer price index climbed at an annual rate of 7.7 percent. Academic salaries have not kept pace with other salaries or with the rise in the price level. The real academic salaries of Rochester professors declined by 12.5 percent in the decade 1967 to 1977. No one can accurately forecast price inflation rates, but a replication of the historical inflation trend of the past 5 years would nullify the economic security that was supposed to accompany academic tenure.

Universities were prepared to guarantee employment and to overpay some senior faculty when their financial liabilities were limited by prior agreements for terminating employment at specified ages. Now they will have to turn to less efficient methods for terminating employment, such as forcing resignations or bribing some faculty into early retirement. The higher costs of relying on an inefficient means of limiting the length of employment contracts must ultimately be borne by faculty members and students (*8*).

The extension of the pretenure probationary period increases the uncertainties of an academic career for prospective new entrants. The economic security which used to accompany unlimited tenure has largely been eroded by inflation. These developments operate to reduce the value of an academic tenure contract except to the older, already tenured professors, for whom it has been enhanced by the federal abrogation of mandatory retirement before 70. Tenured professors will obviously attach different monetary values to the newly created rights for up to five more years of guaranteed employment, but they are clearly the recipients of an unanticipated wealth transfer (*9*).

Alternative Responses to the New Law

If universities adhere to their existing salary policy when PL 95-256 goes into effect, direct costs will rise because the mean salary of 65-year-olds is roughly twice that of new assistant professors (*10, 11*). In addition, a lower personnel turnover rate will result in higher intangible costs. The legislatively induced decline in faculty retirement rates comes at an especially bad time, when student enrollments will be falling (*12*). In a contracting market universities must rely on deaths, retirements, and departures to nonacademic positions to generate vacancies for new Ph.D.'s. With lower retirement rates fewer jobs will be available for potential new entrants. The prospect that a department may have to go for 10 or 15 years with no new assistant professor appointments is not a very promising one for academic excellence. The supplies of graduate students are likely to dwindle because of the dim prospects for academic jobs. If an aging faculty is less productive, the quality of teaching and research may suffer. These costs are likely to be higher for the private and older public universities, which tend to have older faculties.

O'Toole (*13*) has advanced a radical proposal: abolish academic tenure. He argues that when there were only a few universities tenure was needed to protect academic freedom, but the rapid postwar growth of higher education has sharpened the competition for scholars. As a consequence, it is harder for any one university to suppress the research and teaching of a distasteful professor. If an individual's scholarly contributions are truly important, the odds are overwhelming that at least one of the 200 or more doctorate-granting universities will demand his or her services. O'Toole believes that the quality of research and teaching will improve when all scholars are nontenured and all must compete for jobs, salaries, and recognition. I doubt, however, that any major university

could afford to take the risk of abolishing tenure while its competitors continue to offer employment contracts that embrace something akin to tenure. In what follows, I shall examine some less radical proposals.

Limited Salary Flexibility

The first of these proposals comes from a simple model in which an individual chooses to retire when A, the utility of full-time leisure combined with retirement income from annuities, Social Security, and personal assets, exceeds B, the utility of less leisure time but more income from continued work. Some individuals may elect early retirement because they experience wage reductions at older ages meaning a lower B utility. Others may voluntarily retire because they can get higher retirement incomes which raise their A utility. Regarding the labor market generally, Boskin (*14*) concluded that declining wages coupled with recent increases in Social Security benefits are largely responsible for the recent trend which has resulted in a median age at retirement of 62 (*15*). Similar pressures toward early retirement have not been exerted on tenured faculty, whose academic labor market is characterized by tenure, a rising age profile of earnings, overpayment of some senior professors, and vested retirement plans.

Nearly all universities follow an implicit salary policy involving only one-sided pay adjustments. Professors are each implicitly assured that their salaries next year will equal or exceed their current pay, $S_{t+1} \geqq S_t$. The introduction of a policy of downward salary flexibility could have two desirable outcomes. First, it would enable the university to achieve a closer alignment between pay and productivity by penalizing the less productive persons. Second, a pay cut would reduce the B utility of continued work, thereby encouraging early retirements. Nothing in our prevailing tenure contracts legally prevents a university from reducing nominal salaries. At least two kinds of objections are sure to be voiced: (i) that pay cuts are contrary to the job security aspect of academic tenure and (ii) that pay cuts will be discriminatory. A salary policy with true downward flexibility may prove to be extremely costly when the secondary costs of administration and litigation are taken into account.

The limited salary flexibility (LSF) plan represents a compromise proposal wherein next year's salary must equal or exceed some fraction $(1 - \gamma)$ of an individual's current pay, $S_{t+1} \geqq (1 - \gamma)S_t$. If γ is fixed at $\gamma = .02$, each employee knows that at worst his or her pay will be reduced by 2 percent. Thus, part of the economic security of tenure is retained in the LSF plan.

If every professor suffered the maximum potential salary cut, the university would enjoy a reduction of γS dollars in its salary budget. This sum, γS, would be put in a common fund together with the university's budget allocation for merit increments. The inflated merit pay budget could then be distributed to individual professors in accordance with established university procedures (*16*). Implementation of the LSF plan should lead to a closer alignment between pay and productivity. If older professors happen to be less productive they will suffer limited salary cuts, but the more productive members (irrespective of age) will garner larger rewards. Since established university procedures will be used to determine merit increments, and the same potential cut γS_t is initially applied to all, the LSF plan can, I believe, be defended against charges of age, sex, or race discrimination.

At least two advantages can be claimed for the LSF plan. First, it rewards more productive persons and penalizes the less productive, but the maximum penalty is limited by fixing γ. Second, if the potential cuts γS are redistributed by merit increments, pay will be more closely aligned to productivity. As a consequence, individuals with declining academic productivity will be given an incentive to choose early retirement.

Periodic Tenure Review and Retenuring

Mayr (*17*) has proposed a plan in which tenure limited only by age would be replaced by contracts with fixed employment terms of say 10 years. Periodic tenure reviews would be made to determine whether an individual's contract should be renewed. If his performance is satisfactory, the professor can be "retenured," that is, given another fixed-term contract.

Reactions to this proposal will obviously vary. Those individuals who prefer risk, who have few family responsibilities, or who are confident of their abilities and marketability will welcome periodic reviews, especially if they believe that such reviews will enhance their salaries and reputations or result in more and better research and teaching. Those who attach a higher value to job security or who dislike the anxiety generated by the review process can be expected to oppose this plan. Brewster (*2*) voiced strong opposition: "I have not been able to devise nor have I heard of any regime of periodic review with the sanction of dismissal which would not have disastrous effects." He did not describe the nature of these "disastrous effects."

The tenure review process is costly to the university, the candidate, and colleagues who must prepare the evaluative letters. Any weaknesses in the present review process, such as placing too much weight on quantity rather than quality of research or favoring personally attractive candidates, are likely to be magnified when the process has to be repeated three or four times in each person's lifetime. The crucial question is whether the gains to the university and to higher education warrant the added monetary and psychic costs (*18*).

Long-Term Contracts

If a long-term commitment is the important element in the tenure contract, it may be possible to approximate this feature by offering contracts with long-term employment guarantees of fixed duration. But what is the appropriate duration? If this plan is to result in a higher faculty turnover rate, the length of the contractual term must be so chosen that the average age at contract expiration is below the currently mandated retirement age of 70. This may entail contracts of varying durations for faculties in different colleges or disciplines (*19*). The age dispersion will pose additional problems. Some precocious persons who earn tenure at very young ages may still be productive and eager to continue working beyond the period of their fixed-term contracts. If the university wants to retain selected individuals, it will have to establish new procedures which specify the criteria for exceptions to the fixed tenure terms.

Several advantages can be claimed for a fixed, long-term contract of 20 to 25 years' duration. First, it provides the individual with a great deal of job security and protects his or her academic freedom over most of a productive lifetime. Second, the university can retain its no-cut salary policy because its financial liability is limited by the length of the contract. Third, risk-averse faculty will be spared the anxiety of periodic tenure reviews. Long-term contracts for athletes and entertainers are apparently legal and binding. I have not been able to determine whether such contracts would be legal for university professors (*20*).

Induced Early Retirement

A university may be unwilling to use salary reductions to obtain faculty resignations. Dismissals are harsh and often distasteful even when they are supported by careful performance evaluations and external reviews. Several universities have tried to induce early resignations by offering positive (usually financial) incentives. These bribes or inducements can be paid either as a lump sum or as a supplemental annuity (*21*). Plans can differ in the formula or procedure that is used to determine the size of the inducement.

The Stanford plan, described by Hopkins (*22*), exemplifies one of the more complicated early retirement schemes. A schedule of lump sum inducements was established in which the lump sum was larger (i) the earlier the age at which a tenured professor agreed to retire, (ii) the longer his or her length of service at Stanford, and (iii) the lower his or her salary in relation to the median salary of faculty in the same field and age bracket. A highly paid professor nearing the then mandatory retirement age of 65 would be offered only a very small lump sum inducement if he agreed to retire early (*23*). The results of a simulation model indicated that implementation of the Stanford plan would lead to a higher demand for new Ph.D.'s, a younger faculty, and a modest (2 percent) increase in total faculty costs (*24*).

It is beyond the scope of this article to examine all the factors that ought to be considered in designing an early retirement plan. Attention is, however, directed to three important features that deserve careful study:

1) Selective versus universal eligibility: The university must decide whether its early retirement option will be selective and restricted to particular individuals or available to all faculty. The Stanford plan was evidently meant to be universal. Selective plans may attract charges of discrimination, but they are cost-effective. University administrators have pretty clear ideas about which individuals ought to be retired. With a selective plan, funds can be targeted toward this subset of "overpaid" faculty members.

2) Contingent annuity benefits: If a universal plan is adopted, the university wants to avoid situations in which its most productive faculty participate in the program, take their separation bonuses (inducements), and accept positions at competing universities. This sort of behavior could be discouraged by offering a contingent supplemental annuity that could be discontinued if the individual accepted another academic job (*25*).

3) Implicit taxation of retirement wealth: The concept of retirement wealth is apparent when the university adopts a vested retirement plan such as TIAA/CREF. Each individual's retirement wealth R depends in an obvious way on the accumulated joint contributions by the individual and the employer, age at retirement, and the market performance of the securities portfolios. R is the property solely of the recipient, who can, in principle, choose to take it in the form of a lump sum or in any one of several annuity plans with a present value of R dollars. The annual retirement annuity A that can be "purchased" with a retirement wealth of R dollars depends on the interest rate r and the individual's life expectancy of N years according to the formula

$$R = A\left(\frac{1+r}{r}\right)[1-(1+r)^{-N}] \quad (1)$$

Some institutions, for example the state universities in California and Illinois, have retirement plans that specify the size of A for the remaining N. The arithmetically wise professor could use Eq. 1 to calculate the implicit value of his or her R corresponding to the fair market value of his or her claims to a remaining lifetime annuity of A dollars per year. If one is not familiar with this conversion formula, one can be misled about the value of inducements stated in terms of supplemental annuity payments.

When the recipients cannot directly observe their retirement wealth R, it is easier for the university to impose an implicit tax on those who choose to postpone retirement. A faculty member at the London School of Economics (LSE) is entitled to an annual retirement annuity given by the formula

$$A = \left(\frac{L}{80}\right)S$$

where L is years of service at LSE and S is salary prior to retirement. The size of the annuity would rise by slightly over 1.25 percent if the individual postponed retirement by 1 year. But the remaining expected lifetime declines by more than 1.25 percent at or around the age of 60; hence implicit retirement wealth falls as a result of postponing retirement. By setting its schedule of retirement benefits A in an actuarially unfair way, a university can impose an implicit tax on the retirement wealth of those who refuse to retire.

The costs of supplemental inducements must be juxtaposed to the benefits that will be realized from the induced early retirement of tenured faculty. As a first approximation, the university's net gain is the difference between the present values of (i) future salaries that would have been paid to the individual and (ii) the monetary value, explicit and implicit, of his teaching and research productivity (*26*). Some writers have wrongly argued that if a 65-year-old professor is paid twice as much as a new assistant professor, the university can afford to offer as much as half of current salary in the form of a supplemental annuity to encourage early retirement. This argument presumes that the 65-year-old and the prospective junior replacement are equally productive. In some exceptional cases the net gains from an early retirement plan could be negative if the elderly participant happens to be a highly productive scholar. The costs and benefits of these schemes will obviously depend on the composition of the tenured faculty who choose to participate in the proposed early retirement plan—that is, on the faculty supply response. This response will be influenced by the structure of the proposed plan (size of supplemental separation bonuses, eligibility, contingent payment constraints, and so on), future levels of academic salaries, and a host of external factors including the individual's health, the real value of TIAA/CREF accounts, which are affected by inflation, and the size of other sources of retirement income, notably Social Security.

Of the schemes described, an early-retirement plan is likely to have the greatest appeal because in it the incumbent tenured faculty retain the initiative in terminating employment. At first blush, it may appear that the university bears the cost, but this is illusory. In a competitive academic labor market, the costs of additional separation bonuses must ultimately be borne by the junior, underpaid faculty, who forgo income in the early stages of their careers in return for the implicit promise of stable salaries and retirement benefits at later ages. An early retirement scheme that concentrates more of an individual's expected lifetime earnings toward the end of his or her career should not be part of a long-run compensation plan for ongoing generations of university faculties. But when the long-run equilibrium is displaced by a law prohibiting mandatory retirement, an early retirement plan may turn out to be a rational short-run policy in the transition to a new long-run equilibrium.

A Two-Track Salary Plan

Gans (*27*) has proposed a scheme in which a person's academic salary is divided into two components:

> The first, based upon rank and seniority, would be defined by the job, would reflect tenure, and would be immutable. The second portion of the remuneration would be awarded on the basis of a scheme that evaluates factors such as teaching, research, and service to the university. . . . The scheme could also incorporate negative increments of the merit fraction of the remuneration.

Under the Gans plan, economic security is assured by the base salary for the job and tenure, but the university will be allowed to exercise downward salary adjustments through the merit-pay component.

A variant of a two-track salary plan can be incorporated into an academic contract that, on the one hand, is in compliance with the new federal legislation and, on the other, explicitly recognizes the dual reciprocal responsibilities of academic tenure. Tenure is not a one-way commitment by the university. The faculty member who accepts a tenured academic position enters into a quasi-partnership agreement which calls for his or her services in two capacities—as employee and as joint director. As an employee he or she is responsible for the education of students and for the production of scholarly research. In addition, the tenured professor assumes the responsibilities of attracting students, designing the academic curriculum, and allocating the university's resources across disciplines and over time. The organization of a university, the departmental structure, the committee system, the academic senate, all confirm the fact that faculty members have accepted their roles as joint directors of the university. One might even advance the conjecture that tenure was created to produce a stable faculty that could properly monitor and constrain the university's president and administrators. The tenure relation is substantively different from the usual one that exists between employer and employees.

Explicit recognition of the dual responsibilities of tenure logically leads to something like a two-track salary plan. First, each faculty member would be paid an annual wage W as compensation for services as a teacher-researcher. Second, every tenured professor would be paid an annual stipend C in return for participating in the management and direction of the institution. Under this plan, the university draws a sharp distinction between employment and tenure. The junior faculty who are promoted to tenured positions can legitimately be expected to fulfill the dual roles of teacher-researcher and director-decision-maker. Each will receive an additional stipend C for serving as a joint director (*28*). The university can continue to rely on established procedures (such as individual performance valuations) for determining the wage income W.

Under PL 95-256 the university will not be able to require retirement from employment before the age of 70, but it should be able to terminate the service of tenured professors as quasi partners in the management of the institution. Rules and regulations would have to be revised so that the rights and privileges of tenure extend for a term of fixed duration (*29*). Upon removal from the ranks of the *tenured* faculty an individual would lose the stipend for tenure C but would still be paid a wage W for services as a teacher-researcher (*30*). The implementation of this two-track salary plan will result in the establishment of three types of faculty members: (i) junior faculty in the pretenure, probationary period, (ii) tenured faculty who have the joint responsibilities of teacher-researcher and decision-maker, and (iii) senior faculty employees who have been relieved of their leadership and management duties. PL 95-256 compels the university to provide employment for its teaching faculty but does not require it to retain the same individuals as active participants in the administration of the institution. Tenure implies employment, but employment does not imply tenure.

Concluding Remarks

The federal abrogation of mandatory retirement before 70 must increase the costs of academic tenure. If universities take no steps, faculty turnover rates will fall, salary budgets will rise, and the quality of higher education will deteriorate. Although we can agree that every scholar's productivity eventually diminishes with increasing age, it is difficult to determine the point at which it becomes unsatisfactory. Incipient senility is like a pain in the lower back: the condition cannot be definitively established from observable data. Some alternative to age-based mandatory retirement must be adopted to limit both the term of employment and the university's financial obligations.

The 1978 amendments exhibited signs of having been hastily conceived and enacted. The deferred dates at which the law becomes applicable for different classes of workers were evidently designed to allow sufficient time to study the possible consequences of the law. Regulations governing acceptable methods of terminating employment before 70 or outlining exceptions to the law have not been drafted.

The flow of personnel through the academic promotion hierarchy continues. Inaction is an unacceptable option for many university presidents. They must decide upon an appropriate course of action. I have tried in this article to describe and assess some of the options. An optimal strategy might combine several of these proposals. I favor a two-track salary plan in which tenure is granted for a fixed term but employment is guaranteed for the period specified by the pertinent federal or state laws. The task of designing an optimal response to PL 95-256 is not an easy one. The federal government has succeeded in presenting university presidents with a difficult problem of decision-making under uncertainty.

References and Notes

1. "Academic freedom and tenure," *Am. Assoc. Univ. Prof. Bull.* **42**, 42 (1956), cited in (*3*).
2. K. Brewster, Jr., *ibid.* **58**, 381 (1972).
3. A. Alchian, *Economic Forces at Work* (Liberty Press, Indianapolis, 1977), pp. 177–202. [reprinted from *The Public Stake in Union Power*, P. D. Bradley, Ed. (Univ. of Virginia Press, Charlottesville, 1958), pp. 352–371].
4. S. Freeman, *Bell J. Econ. Manage. Sci.* **8**, 419 (1977).
5. The model can be extended to more than two periods and to several kinds of individuals. See S. Freeman (*4*) or W. Y. Oi, "Academic tenure and mandatory retirement" (April 1979, unpublished).
6. In conversation, P. Munch and W. Meckling have questioned the plausibility of two assumptions in the model, namely symmetrical ignorance and stochastic production. If individuals had full knowledge of their innate abilities, and if actual productivity were positively related to pay in a nonstochastic way, adverse selection and moral hazard would make the implicit income-insurance scheme unworkable. I agree with Munch and Meckling that there is a positive association between pay and expected productivity. But there are elements of uncertainty in academic production functions. Even though the odds are small, a lucky Beta could make important scholarly contributions in several successive periods. The presence of some uncertainty, coupled with risk aversion, is in my opinion sufficient to explain employment contracts that promise income stability to those less fortunate individuals whose actual output falls short of expected output. Finally, the Freeman model should be extended to allow for qualitative differences among employing institutions.
7. To the extent that everyone is ignorant about his or her identity and future productivity, everyone will be willing to pay something for income insurance. Hence, even successful professors get the benefits of the ex ante protection afforded by the implicit insurance plan.
8. The banning of mandatory retirement before 70 can be viewed as simply another application of the Le Chatelier principle. If forcing resignations or inducing early retirements were truly less costly (when we take account of the implicit costs of low morale and lower teaching and research outputs), they should have been adopted before the passage of PL 95-256. The minimum "total" costs which can be attained by a contract subject to N constraints must be less than or equal to the minimum costs for a contract subject to $N + 1$ constraints.

9. The law will mainly benefit tenured professors and salaried executives in the upper tail of the income distribution. The vast majority of workers, who are paid at hourly rates, will not be affected by PL 95-256. Most of them are now voluntarily choosing to retire at or before the age of 65. The median age of retirement for all workers is currently 62. Recent increases in the size of Social Security retirement benefits, coupled with the earnings test, are largely responsible for a decline in the median age at retirement. Since Social Security benefits make up only a small fraction of the retirement incomes of college professors and executives, the size of such benefits has little impact on the decision to retire.
10. "The impact of federal retirement-age legislation on higher education," *Am. Assoc. Univ. Prof. Bull.* **64**, 181 (1978), a report of the Special Committee on Age Discrimination and Retirement (M. W. Finkin, chairman, M. Bernstein, M. Eymonerie, W. Hammerle, W. L. Hansen, T. P. Schultz, P. O. Steiner).
11. In the simulations for (*10*), the salary of the typical 65-year-old professor was assumed to be twice the starting salary of an assistant professor. At Rochester the corresponding ratio in 1977-78 was roughly 1.8.
12. The National Center for Education Statistics projects that total enrollments in institutions of higher education will fall 9.0 percent between now and the late 1980's. This projection is, in my opinion, optimistic in the light of the census figures which reveal a 14.5 percent decline in the population of persons 18 to 21 years of age.
13. J. O'Toole, *Change* **10** (No. 6), 24 (1978).
14. M. J. Boskin, *Econ. Inquiry* **15**, 1 (1977).
15. Boskin's data (*14*) reveal that the wages of blue-collar workers tend to decline beyond the age of 60. At the present time 62 is the youngest age at which a nondisabled worker becomes eligible for Social Security retirement benefits. Further, complete or virtually complete withdrawal from the labor force is encouraged by tying Social Security benefits to a stringent earnings test.
16. If the university's budget allocation for merit increments is 5 percent (a plausible figure in an era of tight budgets), and if $\gamma = .02$, the total fund available for merit pay increases will be equal to 7 percent of the salary budget. At Rochester allocations of merit increments are made by department chairmen and deans in the light of individual performance evaluations.
17. E. Mayr, *Science* **199**, 1293 (1978).
18. Notice that if the length of the fixed term is reduced to 1 year, we are back to O'Toole's recommendation of abolishing academic tenure.
19. The ages at which individuals earned tenure at Rochester over the period 1973 to 1977 (when the maximum pretenure period was 11 years) varied from 28 to 41 in the College of Arts and Science and from 36 to 55 in the School of Medicine and Dentistry. The longer training period for the medical faculty (many hold both the Ph.D. and M.D. degrees) is evidently responsible for the later age at tenure. There is, in principle, no reason to insist that the same contractual duration be offered to faculties in different colleges or disciplines, but administrators shudder at the thought of trying to explain the reasons for different treatment.
20. I suspect that even if fixed-term contracts are legal, the university will have to evaluate each tenured professor at or near the expiration date of the contract in order to justify termination or extension. Exceptions and extensions which allow a person to remain beyond the original contractual term should, in my opinion, be determined by an individual case-by-case assessment.
21. The two methods of payment would be equivalent in a perfect capital market where future annuities can be converted into a present value lump sum and vice versa. But a disabled veteran will have difficulty in the sale of the "rights" to his future benefit payments because the buyer probably cannot legally garnishee those benefit payments. Lump sum payments are thus likely to be of greater value to the recipient.
22. D. S. P. Hopkins, *Oper. Res.* **22**, 455 (1974).
23. The salary variable in the Stanford plan can be justified in two ways. First, at a university like Stanford an individual's salary (especially for older tenured faculty) is closely correlated to his or her productivity. Each person is placed in a low, middle, or high salary category where the categories vary by age and major field. In the language of the Freeman model, persons in the "low" salary group are more likely to have come from the unproductive Betas who are being overpaid; hence it is rational to offer them larger inducements to retire. Second, an individual's salary in relation to his or her peers reflects the probable size of his or her TIAA/CREF account, which in turn determines the retirement annuity. These low-salaried faculty "need" larger lump sum payments to realize a "reasonable" retirement income.
24. The "total faculty cost" is the sum of three components: salaries during the period of employment, university contributions for retirement, and supplementary retirement payments to induce early retirement. The critical parameter in these simulations is the size of the faculty supply response to the lump sum inducements. It would be interesting to compare the results of the 1974 simulations with the actual experience at Stanford.
25. Social Security retirement benefits exemplify a contingent annuity plan. Under the earnings test, beneficiaries can lose part or all of their benefits if their wage earnings exceed the allowable limit. Contingent plans can also be found in the private sector. When the erstwhile president of Ford accepted a position with Chrysler Motors, he relinquished his claims to more than $1 million in separation bonuses from Ford.
26. An additional positive value can be assigned to faculty turnover if younger professors are better able to adapt to the rapidly changing conditions of a dynamic, uncertain world. This indirect benefit ought to be included in a second approximation to the net gains from induced early retirement.
27. C. Gans, *Science* **200**, 604 (1978).
28. It is difficult to monitor and measure the "output" of a director-manager. Some scheme will have to be devised to fix the size of the stipend C that will be paid to tenured faculty. Gans would tie C to rank and seniority. I favor a scheme in which C is some fraction K of the individual's wage income W; $C = KW$. Such a scheme tacitly assumes that the more productive teacher-researcher will also be a better joint director. K could be increased with seniority, say from .05 at the time of attaining tenure to a maximum of .20 at 25 years of tenured service.
29. Management can clearly be separated from employment. In some German firms unionized workers serve on the board of directors, but employment per se does not guarantee membership on the board. Tenure contracts of fixed duration have the advantage of assuring an orchestrated rotation of the faculty in the key administrative positions and committees. If the courts permit a compensation plan which separately rewards employment and tenure, it may be possible for universities to terminate the tenure of incumbent tenured faculty when they reach the age of 65, which is the present rule at Rochester. Finkin *et al.* (*10*) state that it may be legal to stop university contributions to employee retirement plans at "usual" retirement ages below the federally mandated age of 70.
30. Some may object to the fact that an individual's academic salary will fall from $W + C$ to W at the expiration of tenure. It should be pointed out that one does not have to retire from employment in order to tap one's retirement wealth in a TIAA/CREF account. By electing to withdraw some annuity income prior to retirement from work (but following the end tenure stipend C), a tenured professor can offset the loss of C.
31. This article is part of a larger project under the direction of James Doi, formerly dean of the College of Education, University of Rochester. It was motivated by President Robert Sproull, who asked me to chair a faculty committee to examine possible responses to the 1978 amendments to the Age Discrimination and Employment Act of 1967. I wish to thank the members of that committee, R. Berg, J. Doi, W. Newman, and R. Niemi, for their suggestions. P. Munch of the Rand Corporation read an earlier draft and offered many helpful comments. Financial assistance for the project was provided by the Carnegie, Ford, and Mellon foundations.