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TERM LENGTH AND THE QUALITY OF APPOINTMENTS

Amihai Glazer
Vesa Kanniainen

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CESifo
Center for Economic Studies & Ifo Institute for Economic Research
Poschingerstr. 5
81679 Munich
Germany
Phone: +49 (89) 9224-1410/1425
Fax: +49 (89) 9224-1409
http://www.CESifo.de

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Abstract

Consider a principal who appoints an agent. Let the agent potentially serve for a sufficiently long time that one principal is replaced by another over this period. Suppose also that the quality of the agent appointed increases with the effort the incumbent principal devotes to hiring. Then the quality of the appointment may increase with the length of the agent's term. Moreover, policies such as mandatory retirement which increase a prinicpal's concern for output after he leaves office, may induce better hiring.

Keywords: Hiring, tenure, quality of appointment

JEL Classification: J20, J40

Amihai Glazer
University of California, Irvine
Department of Economics
Irvine, California 92697
USA
email: aglazer@uci.edu

Vesa Kanniainen
University of Helsinki
Department of Economics
P.O. Box 54
00014 University of Helsinki
Finland
email: vesa.kanniainen@helsinki.fi

1 Introduction

Leaders (or principals) are often responsible for appointing people (agents) who will exercise authority in some area. Good appointments, such as of Alan Greenspan to head the Federal Reserve Board, can be highly beneficial. Finding good candidates for appointment, and inducing good candidates to accept the position, however, may require much costly time and effort by the principal. As we shall see, a principal may have insufficient incentive to appoint good agents.

Our paper examines one institutional feature that affects the quality of appointments—the length of the term to which an agent is appointed. We shall see that under some conditions a longer term increases the benefit to the principal of appointing a good agent; one implication is that long terms may increase social welfare. In addition, the length of a term can affect the willingness of different types of agents to accept the position; this selection effect may, but need not always, also call for longer terms.

Our approach offers a new perspective on the issue of term lengths. In economics the topic of term lengths is prominent in studies of central banks. A long term is seen as making a central bank independent, and insulating it from political pressures tied to election cycles. Indeed, some studies find that inflation is lower in countries with independent central banks. [1] Not surprisingly, the issue of independence, and of term lengths for central bankers, were critical in the design of the European Monetary Institute which controls monetary policy for the euro.

Term length is critical to the analysis of job security, as in academic tenure. McPherson and Winston (1983) argue that the highly specialized nature of academic production makes long-term job security desirable. Brown (1997) sees the tenure contract as providing incentives for the faculty to assume the roles normally associated with ownership, free of reprisal from administrators. Carmichael (1988) argues that academic tenure induces departments to hire the best job candidates. He differs from us in two ways. First he focuses on how members of an academic department may fear that hiring high-quality faculty will reduce the future income of current members. We instead consider the effort required to identify good candidates. Second,

[1] Widely cited papers are Alesina (1989) and Cukierman et al. (1992). Recent work which finds that central bank independence lowers the mean and variance of inflation is Eijffinger, Schaling, and Hoeberichts (1998).

Carmichael looks at how the incentives of current faculty vary with their own tenure; we also consider how tenure granted to the persons hired affects the incentives of those who make the appointments.

The theoretical analysis here relates to work on hierarchies and selection in organizations. Harrington (1999a and 1999b) considers a hierarchy in which the agents who perform best advance to higher levels, focusing on why agents who are promoted may be those who are most rigid. MacDonald (1988) examines replacement policies in a market. He supposes that there is uncertainty about individual performance and that past performance correlates with future outcomes. Successful performers continue to work, gaining a large share of the market; unsuccessful performers exit. Since he focuses on workings of the market, however, he does not examine the optimal effort in finding agents.

Lastly, other work relates to our assumption that a principal cares about outcomes after he is in power, and may take actions now to affect future outcomes. Commitment in public policy was discussed by Strotz (1955-56), Kydland and Prescott (1977), Barro and Gordon (1983), and Persson (1988). They show that current decisions of economic agents depend, in part, on their expectations of future policy actions. Phelps and Pollak (1968) apply the principle to determine optimal savings decisions. Alesina and Tabellini (1988) and Tabellini and Alesina (1990) extend these insights by showing that voters may favor budget deficits which constrain future public policy. Glazer (1989) applies these principles to demonstrate that collective choices will show a bias towards durable projects. The effect of institutional design on future policy is discussed by Moe (1989, 1990a, 1990b, 1991), Moe and Caldwell (1994), Moe and Wilson (1994), and McCubbins, Noll and Weingast (1987, 1989). These studies, however, suppose that principals in different periods may have different preferences; our model in contrast supposes all principals have the same utility function, with each caring only about his own welfare.

Central to our analysis is the assumption that the principal who bears the cost of appointing an agent incompletely captures all the benefits: increased quality of the agent increases social welfare more than it increases a principal's utility, so that the principals will devote insufficient effort. We model this effect by supposing that in each period social welfare is the sum of the utility of the current principal and of the utility of his predecessor. The effects we highlight would be even stronger if a principal's decisions affected more people.

Our assumption means that a principal cares about what happens after he leaves office. One reason may be that former principals are members of society, affected by an agent's actions like other people are. In some situations the benefits may be more direct. The wealth of a retired CE0 who owns stock options increases with the firm's profits; politicians may care about their reputations, which can depend on government performance after they leave office. Or consider a chairman of an academic department who hires new faculty. The chairman's term may be short, but as a faculty member he can benefit from the prestige and research contributions of high-quality faculty.

2 Assumptions

An agent's quality is either *High* or *Low*, denoted as q_H and q_L. An agent of quality q_i generates output v_i, with $v_H > v_L$. For succinctness we shall sometimes call the agents *Good* and *Bad*. The effort a principal devotes to hiring an agent is x. The probability that he appoints a *Good* agent is $p(x)$, with $p'(x) > 0$ and $p''(x) < 0$. The cost of effort is $c(x)$, with $c'(x) > 0$ and $c''(x) > 0$.

An agent serves for one or two periods. An agent appointed with job security (i.e. with tenure) serves for two periods. An agent appointed without job security and ineligible for reappointment serves for one period. An agent appointed without job security and eligible for reappointment can be appointed for a second period.

The principal lives for two periods. In each period he enjoys the output produced by the agent in that period. A principal discounts output in period 2 of his life by the factor δ. A principal has power in period 1 of his life. Power allows him to fill a vacant office with an agent, or to reappoint an agent if reappointment is allowed and the agent had already served only one period. If the agent was appointed with tenure in the previous period, then the principal does nothing.

After an agent has served for one period, the principal perfectly observes the agent's quality. The nature of our results are unchanged if instead ability was imperfectly observed, though of course the less perfect the observation, the lower the gains from the option to reappoint or fire an agent.

Note that we examine here a model with overlapping generations of principals. In any period two principals are alive. One is in power in that period;

the other was in power in the previous period. This structure generates a potential externality—the appointment a principal makes in one period affects the utility of the person who is the principal next period and of the person who was in power in the previous period.

3 The benefits of long terms

The externality referred to above can result in social gains from long terms for agents. To see the intuition for this claim, consider two extreme cases. Suppose an agent can be appointed for only one period, with no possibility of reappointment. That means that in each period each principal appoints an agent. The principal therefore maximizes

$$c(x) + p(x)v_H + (1 - p(x))v_L, \tag{1}$$

with a solution we call x_1. Suppose instead that an agent must be appointed for two periods. A principal who appoints an agent maximizes

$$c(x) + (1 + \delta)(p(x)v_H + (1 - p(x))v_L), \tag{2}$$

with a solution we call x_2. Clearly, $x_2 > x_1$. And since the principal could, if he wished, have set $x_2 = x_1$ and have enjoyed the same utility as when agents serve only one period, the utility of the principal must be higher when he appoints for two periods than when he appoints for one period. Moreover, when an agent serves for two periods, the principal who need appoint no one exerts no effort, yet benefits from the higher effort exerted in hiring by his predecessor. Thus, a two-period term for agents yields higher utility to the principals than does a one-period term.

3.1 An example

We illustrate the effects by specifying some functions. In the following let β and γ be exogenous parameters. Let the probability of hiring a *Good* agent be $p(x) = 1 - \frac{1}{\beta}e^{-\beta x}$, with $\beta > 1$. Let the cost of effort be $c(x) = \frac{1}{\gamma}e^{\gamma x}, \gamma > 0$. Let $v_L = 0$.

A principal who appoints an agent for one period maximizes

$$\frac{1}{\gamma}e^{\gamma x} + \left(1 - \frac{1}{\beta}e^{-\beta x}\right)v_H. \tag{3}$$

The first-order condition for a maximum is

$$\frac{\partial\left(-\frac{1}{\gamma}e^{\gamma x}+\left(1-\frac{1}{\beta}e^{-\beta x}\right)v_H\right)}{\partial x}=0, \tag{4}$$

with the solution

$$x_1=\frac{\ln v_H}{\gamma+\beta}. \tag{5}$$

A principal who appoints an agent for two periods maximizes

$$\frac{1}{\gamma}e^{\gamma x}+(1+\delta)\left(1-\frac{1}{\beta}e^{-\beta x}\right)v_H. \tag{6}$$

The first-order condition is

$$\frac{\partial\left(-\frac{1}{\gamma}e^{\gamma x}+(1+\delta)\left(1-\frac{1}{\beta}e^{-\beta x}\right)v_H\right)}{\partial x}=0, \tag{7}$$

with the solution

$$x_2=\frac{\ln v_H+\ln(1+\delta)}{\gamma+\beta}. \tag{8}$$

The socially optimal effort in hiring instead maximizes

$$c(x)+2(1+\delta)(p(x)v_H+(1-p(x))v_L), \tag{9}$$

Under the more specific assumptions this becomes

$$\frac{1}{\gamma}e^{\gamma x}+2(1+\delta)\left(1-\frac{1}{\beta}e^{-\beta x}\right)v_H, \tag{10}$$

with the solution

$$x=\frac{\ln 2+\ln v_H+\ln(1+\delta)}{\gamma+\beta}. \tag{11}$$

We see that the socially optimal effort exceeds the effort made by a principal who appoints an agent for two periods, which in turn exceeds the effort made by a principal who appoints an agent for one period.

In the following sections we shall examine whether the social gains from long terms and the suboptimality of effort hold under other conditions. The first question compares welfare when an agent can and cannot be reappointed. We also ask whether it makes a difference if it is the original principal or his successor who has the reappointment option.

We shall also consider the effects of term lengths beyond the principal's efforts, including the incentives of persons of different abilities to serve as an agent.

4 Hiring with reappointment option

Here we relax the previous assumption, by allowing an agent appointed by one principal for one period to be reappointed by the next principal for one period. Suppose that a principal perfectly observes the agent's performance in the previous period. A *Good* agent will be reappointed, and a *Bad* one will not be.

Consider the utility of a principal who appoints a new agent. With probability $p(x)$ the new agent is *Good*, and next period the agent will be reappointed. The principal's utility summed over his two periods is then $(1+\delta)v_H$. With probability $1-p(x)$ the agent is *Bad*, and in the next period a new agent will be appointed. Call the effort made by the principal in the following period, when he hires an agent, x_N. Then the utility of the current principal who happens to hire a *Bad* agent is $v_L+\delta(p(x_N)v_H+(1-p(x_N)v_L)$. Combining these terms gives the expected utility of a principal who appoints a new agent:

$$U^r \equiv -c(x)+p(x)(1+\delta)v_H+(1-p(x))(v_L+\delta(p(x_N)v_H+(1-p(x_N)v_L)). \quad (12)$$

The principal chooses x to maximize this utility, taking x_N as given. To simplify, let $v_L = 0$. For the functional forms we used earlier, the solution is

$$x_r = \frac{\ln v_H + \ln[1+\delta(1-p(x_N))]}{\gamma+\beta}. \quad (13)$$

Recall from above that when the principal appoints an agent for two periods, he chooses effort

$$x_2 = \frac{\ln v_H + \ln(1+\delta)}{\gamma+\beta}. \quad (14)$$

Since $p(x_N) > 0$, it follows that $x_r < x_N$: the reappointment option reduces the effort a principal's effort in hiring. The reason is that the reappointment option, which allows for error correction, reduces the disutility of hiring a *Bad* agent. We thus conclude that the principal's incentive to work hard at appointments may be reduced if his successor controls reappointment.

That result, however, falls short of showing that social welfare is lower when reappointment is allowed. For to determine the socially optimal solution when reappointment is possible we must consider the steady-state

probabilities of an agent's quality when an agent can serve for at most two periods, with reappointment after one period allowed.

Since we can find no general analytic solutions with continuous functions, we turn to a discrete case. Suppose that when effort is 0, the probability of appointing a *Good* agent is p. With a fixed effort at cost c, the probability of appointing a *Good* agent is 1. Designate by L_1 the state that the agent has *Low* quality and is in period 1 of his career. Let H_t be the state that the agent has $High$ quality and is in period t of his career. With reappointment or firing allowed after one period, and with a probability p of appointing a *Good* agent, the transition probabilities are

Transition probabilities of agent's quality

	H_1	L_1	H_2
H_1	0	0	1
L_1	p	$1-p$	0
H_2	p	$1-p$	0

To understand how the entries are derived, consider some examples. A $High$-quality agent who served one period will be reappointed, making the transition probability from H_1 to H_2 equal one. A *Low*-quality agent will be replaced; the newly appointed agent will have $High$ quality with probability p, making the transition probability from L_1 to H_1 equal to p.

The steady-state probabilities (or the average fraction of time that the agent in office is in each of the three states) are given by the eigenvector of the transpose of this matrix, corresponding to an eigenvalue of 1. The solution is $[p/(1+p), (1-p)/(1+p), p/(1+p)]$. For convenience, let $v_L = 0$; then expected output in each period with no effort in hiring is

$$2v_H p/(1+p). \tag{15}$$

If instead a principal exerts the effort which ensures appointing a *Good* agent, output in each period is v_H, and the principal's utility over his lifetime is $v_H(1+\delta)$. In an equilibrium with no tenure for agents all principals exert effort in hiring if

$$v_H - c > pv_H \tag{16}$$

or if

$$c < v_H(1-p). \tag{17}$$

Social welfare calls for exerting effort in hiring if

$$(1+\delta)2v_H\frac{p}{1+p} < v_H(1+\delta) - \frac{c}{2}, \tag{18}$$

or if

$$c < 2v_H\frac{(1+\delta)(1-p)}{1+p}. \tag{19}$$

Now with job security for two periods, the principal will exert effort if

$$c + v_H(1+\delta) > pv_H(1+\delta), \tag{20}$$

or if

$$c < v_H(1+\delta)(1-p). \tag{21}$$

Comparing (21) to (17) shows that tenure increases effort. So if $v_H(1-p) < c < v_H(1+\delta)(1-p)$ and $c < 2v_H\frac{(1+\delta)(1-p)}{1+p}$ then social optimality requires effort in hiring, which can be induced only by giving job security to agents.

That is job security (or committing to an appointment for two periods), can yield the socially optimal outcome; without job security for the agent the principal's effort in hiring is socially suboptimal.

Note that an incumbent principal will oppose granting tenure to the person he hires—a current principal's utility is higher when his successor has the option of reappointing. To see this, consider a putative equilibrium in which all agents are given job security, and succeeding principals exert effort x_2. Consider a principal in power in period t. He could hire an agent, exerting effort x_2, but give the agent no job security. If the agent turns out to be *Good*, then he will be reappointed next period; the principal in period t would then be just as well off as by giving tenure. But if the agent turns out to be *Bad*, in period $t+1$ the new principal will exert effort x_2 to hire a new agent. So the expected quality of the agent increases. The principal in power in period t is better off. Thus, in equilibrium each principal denies tenure to an agent he hires, even if social optimality requires tenure.

5 Reappointment option by appointing principal

As the reappointment option is in the hands of a principal's successor, any current principal works too little on hiring. To highlight the consequences of

overlapping generations, suppose instead that the principal is in charge over two periods, controlling reappointment himself. The principal thus bears in period 2 the full cost of bad hiring in period 1, and so may initially work harder at hiring. The incentive is, however, controlled by the reappointment option which allows him to correct his own mistake. The utility of such a principal is

$$U^r \equiv -c(x)+p(x)(1+\delta)v_H+(1-p(x))(v_L-\delta c(x_N)+\delta(p(x_N)v_H+(1-p(x_N)v_L)). \tag{22}$$

He then must solve a dynamic problem, which can be done by backward induction. As x is bygone in period 2, the optimal value of x_N satisfies

$$(1-p(x))\delta[-c'(x_N)+p'(x_N)v_H]=0. \tag{23}$$

In the first stage a principal thus knows his forthcoming decision should he replace the agent. The optimal decision in stage 1 satisfies

$$c'(x)+p'(x)(1+\delta)v_H-p'(c)\delta[c(x_N)+p(x_N)v_H]=0. \tag{24}$$

For the functional forms we have been using, optimal effort in hiring is

$$x=\frac{\ln\left(v_H\left[1+\delta(1-p(x_N))\right]+\delta c(x_N)\right)}{\gamma+\beta}. \tag{25}$$

We see that a principal's effort when hiring an agent he can later reappoint differs from his effort (x_1) when appointing for one period, and from his effort (x_2) when appointing for two periods. But as the option means more flexibility, welfare cannot decline. In particular, the cost of effort in hiring induces the principal to avoid having to replace a *Bad* agent in period 2, and so induces more effort in hiring in period 1. Combining the conclusions of Sections 4 and 5, we conclude that the reappointment option is welfare-reducing if it belongs to the successor but is welfare-increasing if it belongs to the original principal.

6 Other Implications

Term lengths can affect self-selection by agents. Suppose an agent values a good reputation. If he serves for only a short period, then observations of his performance are noisy, and he cannot earn a reputation as having been a

great agent. In contrast, if he serves for long and the noise in each period is independent of noise in other periods, then the agent can earn a reputation as a *Good* agent. Therefore, a long term will better attract *Good* agents. This means that the above analysis can be extended to make the probability of hiring a *Good* agent increase with the term length.

Lastly, our model may give a novel explanation for mandatory retirement. Consider a principal who knows he will die immediately after his last period in office. Then in that last period he has weak incentives to appoint a *Good* agent. If instead he is forced to retire some years before he expects to die, then the principal does care about the performance of an agent after the principal's last period in office, and will therefore spend more effort on appointments. The incentive can be especially large if the principal is awarded stock options he can exercise only after retirement.

7 Conclusion

Most analyses of tenure consider how the persons responsible for hiring will change their behavior when they are given job security. We focused on the other side—how job security awarded to the persons hired affects the behavior of the persons who hire. Though flexibility and the ability to search for the best workers suggest that job security for workers would reduce their quality, we saw that the incentive effects can lead to the opposite effect.

If job security has such good effects, why is tenure rare? One reason is the same as that offered in earlier analyses of tenure. It may be more difficult to evaluate the quality of applicants for some jobs than for others. When evaluation requires much effort, job security can increase the effort made. Moreover, this effect will be stronger when for one reason or another an individual cares about the performance of persons hired long after he himself leaves the job. Academia has both these characteristics, and so not surprisingly commonly offers tenure.

8 Notation

$c(x)$ Cost of effort x

$p(x)$ Probability that principal appoints agent of $High$ (or *Good*) quality

q_i Quality of agent, with $i = H$ or $i = L$

v_i Output of agent with quality i

x Principal's effort in hiring

$\widehat{x}$ Optimal effort for principal

δ Intertemporal discount factor

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