Economics of Promotion & Tenure Committees

by

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Abstract

Shah and Stiglitz (1986, 1988) find that one evaluator who *approves* a project accepts more bad projects and rejects fewer good projects than would two evaluators. In academia, faculty committees *recommend* candidates for promotion and tenure, but the ultimate decision lies with administrators. I find the Shah-Stiglitz results are reversed with a high enough probability the administration will promote or tenure one who has received a split recommendation from two faculty committees. Also, *either* one or two committees could have *fewer errors of both types* depending on which committee is more accurate. Evidence that similar universities choose different structures supports the theoretical model.

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1. Introduction

Promoting and tenuring high quality faculty members is critical for a university's reputation. A neglected aspect of the promotion and tenure process is what Shah and Stiglitz (1986) call the *architecture* of an economic system. My intention is to consider which structure leads to fewer errors in promotion and tenure: having only an academic department committee recommend candidates, or having a committee outside a department also recommend candidates.

Shah and Stiglitz (1986, 1988) consider the optimal structure of an organization in which one must determine which projects to accept. They consider a *flat structure* (what they call a polyarchy) with one evaluator, and a *hierarchy* with two evaluators. In the former case, a single evaluator decides whether to accept a project. In the latter case, both evaluators must approve the project if it is to proceed. Projects are either good or bad. Evaluators are equally talented, have the same probability of accepting a bad project as they do of rejecting a good project, and are unbiased.

Shah and Stiglitz (1986) find that a flat structure selects a larger number of projects than does a hierarchy. Thus, a flat structure accepts more bad projects and rejects fewer good projects than a hierarchy. Lazear and Gibbs (2009) introduce the possibility of something in between a flat structure and a hierarchy, what they call a *second opinion structure*. However, the basic points remain unchanged: an organization trades off the two types of errors (Lazear, 1995), and the closer the organization is to a flat structure (*resp.*, a hierarchy), the more bad projects that are accepted (*resp.*, the more good projects that are rejected).

Following Stiglitz and Shah (1986), if, for example, universities fear promoting and tenuring bad candidates more than they fear rejecting good candidates, then they would have both department and external promotion and tenure committees. However, there are several distinct features of academic evaluation as compared to project evaluation in a firm. These features, discussed in more detail in the next section, are the following. Faculty committees do not decide whether a candidate receives promotion or tenure. Rather, they (along with lower level administrators) *recommend* candidates. Senior administrators (provosts, chancellors, and presidents) have the final decision.[1] Also, committees do not have equal ability or bias.

Introducing an administrator who makes the ultimate personnel decision leads to the possibility of reversing the previous conclusions regarding which structure leads to the most errors of either type. Also, depending on which committee more accurately judges candidate ability, one structure may involve *fewer errors of either type*. These results have important implications for the optimal architecture for personnel decisions in academia.

Although my intention is to analyze how I believe promotion and tenure committees and administrators behave, my results also can be used for normative analysis of promotion and tenure. Lazear (1995) considered the problem of positive analysis being prescriptive:

"A good positive theory is a description of what is, and this precludes a role for those who want to teach it to others as a behavior ideal…Alternatively, we can argue that businesses do not behave according to our models but should…The answer lies in the middle ground. While economics may do very well at explaining most of what goes on in the world, some economic agents may not behave as they should."[2]

If, as Lazear suggested, profit-maximizing firms may benefit from some positive economic analysis, it is possible that some non-profit-maximizing universities may not have an optimal structure for promotion and tenure. In the next section, I consider the differences

[1] I ignore the fact another entity (*e.g.* a board of trustees) technically may have the final decision, given that such entities rarely fail to follow the recommendation of the top administrator involved in promotion and tenure decisions.
[2] Lazear (1995), p.7. For additional discussion of how firms can learn from academic research, see Lazear and Shaw (2011).

between academic personnel decisions and firms that must evaluate projects. In Section Three, I present a general theoretical model. I show when the flat structure is clearly superior to a hierarchy, and vice versa, in Section Four. In Section Five, I extend the model. Some evidence and conjectures are presented in Section Six, and I conclude in Section Seven.

2. Features of academic evaluation

A. Administrators decide

In the Shah-Stiglitz (1986) model, either one or two evaluators approve a project. With two evaluators, both must approve. In a university, faculty committees recommend and administrators decide. Herein, a flat structure means there is only the department promotion and tenure committee and the administration.[3] A hierarchy means there are department and college promotion and tenure committees and the administration.[4]

Although the administration has the ultimate decision, one might argue the administration rarely goes against the clear sentiment of the faculty. I agree. I assume the administration never goes against a department recommendation when there is only a department committee, and never goes against the department and college committees when the committees are in agreement. However, I assume there is a positive probability the administration will grant tenure or promotion if there is a split between the department and college committees. Thus, I assume an administration that is neither relatively intrusive nor completely passive.

[3] Technically, there is a hierarchy when just the department committee and the administration exist. However, as shown in Section Three, if the administration never promotes or tenures one when there is a split vote, then essentially there is a flat structure when there is only the department committee. Thus, to be consistent with the literature, I will refer to that case as a flat structure. The term hierarchy will be used when there are department and college committees that recommend to the administration.

[4] Some universities have committees at the department and college levels, some have committees at the department and university levels, and some have committees at all three levels. I will focus on either one (the department) or two committees, with the second committee referred to as the college committee.

B. The committees may not have the same accuracy

Shah and Stiglitz (1986) assume evaluators are unbiased and equally talented. Extensions of their analysis are found in Lazear and Gibbs (2009), who assume the second evaluator is more likely to make a correct decision, given knowledge of what the first evaluator did, and in Shah and Stiglitz (1988), who assume evaluators have the same values, but differ in the extent of information they possess.[5]

In promotion and tenure decisions, a college committee should be less able than a department committee to judge an applicant. If the college committee is independent, it will ignore what the department committee did. Even, if the college committee updates its information based on the recommendation of the department committee, it still may be the case that the college committee is less likely than the department committee to make the correct recommendation. Although I believe the department committee will be more accurate, and will emphasize that case, I allow for the possibility the college committee is more accurate. I assume the two committees have different information and, possibly, different values.[6]

C. Bias

I only consider the possibility of favorable bias in a department. Putting aside for the moment prejudice based on religion, ethnicity, or the like, neither favorable nor unfavorable bias is likely to be important for a college committee, given the candidate is not as well known outside his department.

[5] Henceforth, the Shah-Stiglitz results refer to the original (1986) paper by Shah and Stiglitz.

[6] Carmichael (1988) assumes the administration has worse information about new job candidates than do incumbent department members. Although the gap in knowledge may be reduced somewhat as one who is hired develops a record, it still seems reasonable that a professor’s department colleagues are better prepared to evaluate the professor than is any other group in the university.

Zinovyeva and Bagues (forthcoming) consider promotions in Spanish universities. From 2002 to 2006, universities in Spain randomly chose evaluators from across universities to assess the quality of applicants for promotion to associate and full professor. When a committee included a candidate's colleague, co-author, or advisor, the probability of promotion increased by about six percentage points, when the overall probability of promotion was about eleven percent. However, I doubt that such a level of bias would exist in universities that have a reasonably strong research record since it would be difficult for a department to develop and maintain a reputation for research if it promoted based on favorable bias. Note that only one Spanish university---Pompeu Fabra---is ranked in the top 200 universities in the London Times Higher Education World University Rankings 2013-2014. Of the 75 top economics departments in the U.S. considered here (McPherson, 2012), 59 were from universities in the Times top 200.[7]

Bias against a candidate in the department is not considered. One reason is that candidates can hide certain personal characteristics. There should be an asymmetry, with more favorable bias than unfavorable bias. For example, in the 1950s, one could hide communist sympathies by not joining the Communist Party. Another reason unfavorable bias is ignored is, if the extent of bias (favorable or unfavorable) is similar throughout a university, the effects will tend to cancel (see Section Five). Also, unfavorable bias is simply the opposite of favorable bias in affecting the likelihood the Shah-Stiglitz results will be overturned (see footnote eighteen). Finally, bias based on religion, race, gender, etc. is likely to be a university-wide problem.

On the latter point, consider prejudice in U.S. universities prior to World War Two. Oren (2000) notes Yale had never tenured a Jew or a known Catholic in 1929. As of 1931, there were no Jewish faculty in Yale College, with a few Jews in the graduate and professional schools.

[7] See http://www.timeshighereducation.co.uk/world-university-rankings/2013-14/world-ranking.

Only after World War Two did a Jew receive tenure. Feur (1982) notes that, in 1930, Washington Square College of NYU had an undergraduate body of 7000 that was 93% Jewish, but had only eight Jewish faculty. Ginzberg (1990) suggests one reason Princeton did not hire Jacob Viner in the mid-1920s was anti-Semitism.[8] According to Perlman (1976), the number of Jews appointed to major faculty positions in economics in the U.S. increased slightly in the 1930s, among them appointments of Simon Kuznets at Columbia, and Arthur Burns at Rutgers. The biggest increase of Jews into the faculty occurred after World War Two.

Possibly the most famous case of alleged anti-Semitism in hiring in an economics department involved the failure of Paul Samuelson to obtain a suitable appointment at Harvard. In June 1940, Samuelson was offered a one year instructorship by Harvard, where he was a fellow. In October 1940, MIT offered Samuelson an assistant professorship, which he accepted.[9] Samuelson (2002) claims there were virtually no tenured Jewish faculty members in the Ivy League in the period from 1920 to 1945.[10] The widespread ant-Semitism in U.S. universities in the 20th century prior to World War Two suggests that prejudice against Samuelson[11] in the economics department at Harvard reflected prejudice throughout Harvard and many other universities.[12]

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[8] Viner was hired at Princeton, but not until 1946.

[9] Backhouse (2013) observes that (unnamed) others suggest antipathy towards mathematical economics, and a reluctance by mediocre faculty to hire someone who was clearly superior played some role in the lack of a good offer for Samuelson from Harvard.

[10] An undergraduate at the University of Chicago, Samuelson noted the advantage that Chicago had in attracting good faculty in that it would hire talented Jews. Samuelson (2002) relates this story he heard from his University of Chicago classmate Jacob Mosak. When professors in the Chicago economics department decided to recruit Henry Schultz in the 1920s, someone told them the UC president did not like Jews. Frank Knight, Jacob Viner, and others responded that the president could veto the appointment, but they would go ahead with the recommendation to hire Schultz. The president did not veto Schultz.

[11] Samuelson did not claim he had professionally ever "…suffered the pains of bias" (Samuelson, 2002, p.47). He did note the Harvard chair's anti-Semitism.

[12] Perlman (1976) argues that Milton Friedman was denied a tenured position at the University of Wisconsin in 1940 "…for overtly anti-Semitic reasons…" (p.307). Friedman was initially to have been offered a tenured position, but opposition from some of the economics faculty resulted instead in the offer of a three-year appointment without tenure. Friedman blamed department politics, and did not recognize the role anti-Semitism may have played until

3. A general model

A. Outline

For brevity, I refer to a tenure decision,[13] but the problem could involve promotion or reappointment. I ignore the problem of achieving consensus within a committee. Also, except for in an extension in Section Five, I ignore the separate decisions by administrators---chairs, deans, provosts, and presidents. Rather I consider either one or two committees which make recommendations to a single administration. Only the administration can make a decision.

Candidates are either *good* or *bad*. A department committee has a probability of p of making a correct recommendation. An error occurs in either accepting a bad candidate, an AB, or rejecting a good candidate, an RG.

An outside committee is referred to as the college committee. The college committee has a probability of ρ of making a correct decision. I assume $½ \leq min(p, \rho)$ and $max(p, \rho) < 1$. As discussed in Section Two, I believe it is more likely a department committee is a more accurate judge of quality than is a committee outside the department, so $\rho \leq p$. However, I will consider the case when $\rho > p$. Also, I assume no one is perfect in evaluating candidates, so $max(p, \rho) < 1$. Finally, there is no sense having a committee evaluate if it is less accurate than a coin flip in judging quality (Lazear and Gibbs, 2009), so $½ \leq min(p, \rho)$.

many years later when Robert Lampmann (1993) wrote his history of the Wisconsin economics department (Friedman and Friedman, 1998). An example of bias against students involves Kenneth Arrow. A native of New York City, Arrow graduated from Columbia in the midst of the Great Depression. He wanted to attend Columbia, could not afford to pay for a university degree, and met with a counselor at Columbia to inquire about the deadline for applying for a scholarship. He was told not to bother because he would not be admitted to Columbia. He was admitted, but had not applied for a scholarship. Unable to attend Columbia, he attended City College of New York, which then had zero tuition for residents of the city. Later he learned the Columbia counselor was an anti-Semite (Düppe and Weintraub, 2014).

[13] *Why* tenure exists has been considered elsewhere. For example, see Carmichael (1988), Aghion and Jackson (2014), and Prendergast (forthcoming, 2015).

To allow for favorable bias, let f equal the fraction of the time the department is favorably biased and recommends tenure for a candidate regardless of the candidate's perceived ability. Again, the college committee is assumed to have no bias.

If there is only a department committee, it is assumed the administration always follows the department recommendation. If there are both department and college committees, the administration follows the two committees if the committees agree. With two committees, if only one of the two committees recommends tenure, the administration recommends tenure t of the time, with $0 \leq t \leq 1$. The administration plays no role in the analysis *except* if there is a hierarchy and the two committees disagree.

Prendergast and Topel (1996) argue that supervisors value their ability to affect the welfare of subordinates. In academia, this suggests that administrators would not commit to not tenuring one with a split vote from recommending committees. Thus, the likelihood of the administration granting tenure with a split vote, t, can be treated as exogenous. Institutional history and characteristics of administrators likely determine t.[14]

Henceforth a flat structure accepting more candidates than a hierarchy, which implies more ABs and fewer RGs with a flat structure than a hierarchy, will be referred to as the *Shah-Stiglitz results*.[15]

[14] Prendergast (forthcoming, 2015) suggests universities differ in how much administrators intervene in the evaluation of candidates for tenure. Herein, such a difference implies that t varies among universities. Prendergast is interested in how different control rights affect the kinds of activities undertaken by candidates for tenure, an issue that is ignored herein.

[15] Lazear and Gibbs (2009) consider a situation with two evaluators who each review N projects per period. With a flat structure $2N$ projects are evaluated, but, with a hierarchy (each project reviewed by both evaluators), only N projects are evaluated. Although a hierarchy results in a higher *rate* of good applicants rejected, the *total number* rejected is lower with a hierarchy because only one half as many projects are evaluated with the hierarchy as are considered with the flat structure. In the problem herein, the number of candidates evaluated is the same regardless of which structure is used.

Proposition One. *If there is a high enough probability the administration will tenure one who has received a split vote from the two committees, the usual likelihood of errors is reversed: more bad candidates receive tenure with a hierarchy, and more good candidates are rejected for tenure with a flat structure.*

Proof. The rest of this section develops the proof of Proposition One. I first consider accepting a bad candidate. Note, Proposition One does *not* depend on the relative values of ρ and p.

B. Accept a bad candidate

Recall the assumption the administration grants tenure to a candidate in three cases: when 1) there is only a department committee, and the committee recommended tenure, 2) there are department and college committees, and both recommended tenure, and 3) there are two committees, only one of which recommended tenure. In the first two cases, tenure is awarded 100% of the time. In the third case, tenure is awarded t of the time.

Let prob(AB|1) be the probability of accepting a bad candidate (a false positive) with only the department committee, and prob(AB|2) be the probability of accepting a bad candidate with two committees. With only one committee, an AB occurs if the department has favorable bias, or if the department makes a mistake. With two committees, an AB occurs if both committees make a favorable recommendation, or if the committees split and the administration grants tenure. We then have:

$$\text{prob(AB|1)} = f + (1\text{-}f)(1\text{-}p), \tag{1}$$

$$\text{prob(AB|2)} = [f + (1\text{-}f)(1\text{-}p)][1\text{-}\rho + t\rho] + p(1\text{-}f)(1\text{-}\rho)t. \tag{2}$$

One Shah-Stiglitz result is that a flat structure leads to more ABs. This occurs if prob(AB|2) < prob(AB|1), with prob(AB|1) independent of t. If $t = 0$, prob $(AB|2)|_{t=0} = [f + (1-f)(1-p)][1-\rho] <$ prob(AB|1). When $t = 0$, the administration essentially does not exist, and more bad candidates receive tenure with a flat structure. If $t = 1$, prob $(AB|2)|_{t=1} = f + (1-f)(1-p) + p(1-f)(1-\rho) >$ prob(AB|1). Thus, for a large enough value for t, a hierarchy has more ABs than would a flat structure, reversing the Shah-Stiglitz result.

Why could more bad candidates receive tenure with a hierarchy? With a flat structure, if the department rejects a candidate, the individual does not receive tenure. With a hierarchy, even if the department rejects a candidate, if the college recommends the individual, and t is high enough, the second chance aspect of the hierarchy can result in prob(AB|2) > prob(AB|1).

The critical value for t is t_B, found by setting prob(AB|1) = prob(AB|2). Note, the Shah-Stiglitz result is that $t_B = 1$.[16]

$$t_B = \frac{\rho[1-p(1-f)]}{p+\rho-2p\rho(1-f)-pf} \,. \tag{3}$$

If $f = 0$, $t_B = \frac{\rho(1-p)}{p+\rho-2p\rho} > 0$. Also, $t_B|_{f=0}$ is < 1 if $p(1-\rho) > 0$, which is true. If $f = 1$, $t_B = 1$. Finally, t_B increases monotonically in f:

$$\frac{\partial t_B}{\partial f} = \{+\}p\rho(1-\rho) > 0. \tag{4}$$

[16] The denominator of t_B in *eq*.(3), call it D, is clearly positive. When $f = 0$, $D = p + \rho - 2p\rho = (p-\rho)^2 + p(1-p) + \rho(1-\rho) > 0$. When $f = 1$, $D = \rho$. Since D is linear in f, $D > 0\ \forall f$.

As f increases, fewer are rejected with a flat structure. Thus, it becomes less likely a flat structure can result in fewer bad candidates accepted than with a hierarchy. If $f = 1$, no candidates are rejected with a flat structure.

C. Reject a good candidate

The second Shah-Stiglitz result is that there is a higher probability of rejecting a good candidate with a hierarchy than with a flat structure. With only the department committee, an RG occurs if the department is unbiased and makes a mistake. With two committees, an RG occurs if both committees make a mistake, or if only one makes a mistake and the administration rejects the tenure request. Then:

$$\text{prob(RG|1)} = (1-f)(1-p), \tag{5}$$

$$\text{prob(RG|2)} = (1-f)(1-p)(1-\rho) + [1-f][p(1-\rho) + \rho(1-p)][1-t] + f(1-\rho)(1-t). \tag{6}$$

If $t = 0$, $\text{prob(RG|2)}|_{t=0} = 1-\rho + \rho(1-f)(1-p) > \text{prob(RG|1)}$ if $1 > (1-f)(1-p)$, which is true. If t is low enough, the Shah-Stiglitz result holds. If $t = 1$, $\text{prob(RG|2)}|_{t=1} = (1-f)(1-p)(1-\rho)$, which clearly is less than prob(RG|1). Thus, for large enough values of t, a hierarchy can reject fewer good candidates than would a flat structure.

Why could there be fewer RGs with a hierarchy than with a flat structure? If the department rejects with a flat structure, that is the end of it. When there is a hierarchy, a department rejection, acceptance by the college, and a large enough value for t mean a second chance with the hierarchy can lead to the hierarchy rejecting fewer good candidates than a flat structure.[17] With the Shah-Stiglitz result that $t_G = 1$, set prob(RG|1) = prob(RG|2) to find t_G:

$$t_G = \frac{[(1-\rho)][f + p(1-f)]}{f(1-\rho) + [1-f][p(1-\rho) + \rho(1-p)]}\ . \tag{7}$$

If $f = 0$, $t_G = \frac{p(1-\rho)}{p(1-\rho)+\rho(1-p)} < 1$. If $f = 1$, $t_G = 1$. As with t_B, we have t_G monotonically increasing in f:

$$\frac{\partial t_G}{\partial f} = \{+\}\rho(1-\rho)(1-p) > 0. \tag{8}$$

As f increases, fewer are rejected with a flat structure. Thus, it becomes less likely fewer good candidates will be rejected with a hierarchy than with a flat structure.[18]

4. Potential dominance of either structure.

Proposition Two. *Suppose no favorable bias by the department exists, and the department committee is a more accurate judge of candidates than is the college committee. Then the likelihood a flat structure accepts more bad candidates than a hierarchy is lower than the*

[17] Lazear and Gibbs (2009) refer to a hierarchy with $t > 0$ as a second opinion structure. What they call a hierarchy has two levels of evaluators with $t = 0$. One of their claims is that a second opinion structure has the lowest rate of rejecting good candidates. However, this cannot be true in general since, with t small enough, their second opinion structure is essentially the same as their hierarchy. I find a flat structure has the lowest likelihood of rejecting a good candidate if $t < t_G$. Compared to the analysis herein, the second opinion structure is like having one committee and an administration, where the latter *may* accept the committee's recommendation.

[18] Unfavorable bias would have the opposite effect of favorable bias. The more unfavorable bias, the smaller are t_B and t_G, that is, the more likely a flat will have fewer ABs and more RGs than a hierarchy. For simplicity, let $f = 0$, and let u be the probability a department committee rejects a candidate due to bias. Then $t_B = \frac{\rho(1-u)(1-p)}{\rho+u+(1-u)p-2\rho[u+p(1-u)]}$, and $t_G = \frac{p(1-\rho)}{\frac{\rho}{1-u}+p-2p\rho}$. Both t_B and t_G are inversely related to u.

likelihood a hierarchy rejects more good candidates than a flat structure. Thus, it is possible to have fewer types of both errors with a flat structure than with a hierarchy.

Corollary. If the college committee is a more accurate judge of candidates than the department committee, the results in Proposition Two are reversed.

Proof. The proof will be for the case when $p > \rho$. If $f = 0$, $t_B = \frac{\rho(1-p)}{p+\rho-2p\rho}$ and $t_G = \frac{p(1-\rho)}{p(1-\rho)+\rho(1-p)}$.

With $f = 0$, if $p = \rho$, it is easy to see that $t_B = t_G = ½$. First, consider the effects of p and ρ on t_B:

$$\frac{\partial t_B}{\partial p} = \{+\}[2\rho f(1-\rho f) + 6pf\rho^2 + 3f^2 + 2p\rho f^2 - 4p\rho(\rho + f) + \rho(p - 1) - \rho p^2 - 2f^3], \quad (9)$$

$$\frac{\partial t_B}{\partial \rho} = \{+\}p(1-f) > 0. \quad (10)$$

If $f = 0$, $\frac{\partial t_B}{\partial p} = \{+\}\rho[p(1 - p) - 1 - 4p\rho] < 0$. Thus, if bias is insignificant, an increase in p or a decrease in ρ will lower t_B. Now consider the effects of p and ρ on t_G:

$$\frac{\partial t_G}{\partial p} = \{+\}[1-f][f(1-\rho)^2 + p(1-f)(1-\rho)^2 + \rho(1-f)(1-p)(1-\rho) + f(1-\rho)(2\rho-1)$$
$$+ p(1-f)(1-\rho)(2\rho -1)] > 0, \quad (11)$$

with $\rho \geq ½$. Also:

$$\frac{\partial t_G}{\partial \rho} = \{+\}\{-\langle f(1-\rho) + [1-f][p(1-\rho) + \rho(1-p)][f + p(1-f)]\rangle$$
$$+ [f(1-\rho) + p(1-f)(1-\rho)][(2p-1)(1-f) + f]\}. \quad (12)$$

If $f = 0$, $\frac{\partial t_G}{\partial \rho} = \{+\}p(p-1) < 0$. Thus, when $p > \rho$, a larger gap between p and ρ implies a larger t_G and a smaller t_B: it is more likely more good candidates are rejected with a hierarchy than with a flat structure, and less likely more bad candidates are accepted with a flat structure than with a hierarchy. □

Why is $t_B < t_G$ if $f = 0$ and $p > \rho$? That is, as p-ρ rises, why does t_B fall, and why does t_G rise? Consider t_B. If p increases, the department is less likely to recommend a bad candidate. If ρ decreases, the college committee is more likely to recommend a bad candidate. Thus, the disadvantage of a flat structure relative to a hierarchy in accepting bad candidates is reduced, so $dt_B < 0$.

Now consider t_G. If p increases, the department is more likely to recommend a good candidate. If ρ decreases, the college committee is less likely to recommend a good candidate. Thus, the advantage of a flat structure in having fewer good candidates rejected is increased, so $dt_G > 0$.

Figure One illustrates the possible results, depending on t, when $f = 0$. Table One demonstrates that there is a significant range of t for which $t_B < t < t_G$ when $p > \rho$, even if there is not a large difference in accuracy between the two committees. For example, if $p = .9$ and $\rho = .8$, for $.308 < t < .692$, a flat structure has fewer errors of both types than a hierarchy. Also, even with bias, we have the possibility a flat will have fewer errors of both types, as illustrated in Table Two.[19] From Table Two, if bias becomes a significant problem, the range for which $t_B < t_G$

[19] From Table Two, it appears that $[t_G$-$t_B]$ decreases as f increases. This point has not been proven in general (see the Appendix), but, as $f \to 1$, $t_B \to 1$ and $t_G \to 1$.

Figure One. When $p > \rho$ and $f = 0$.

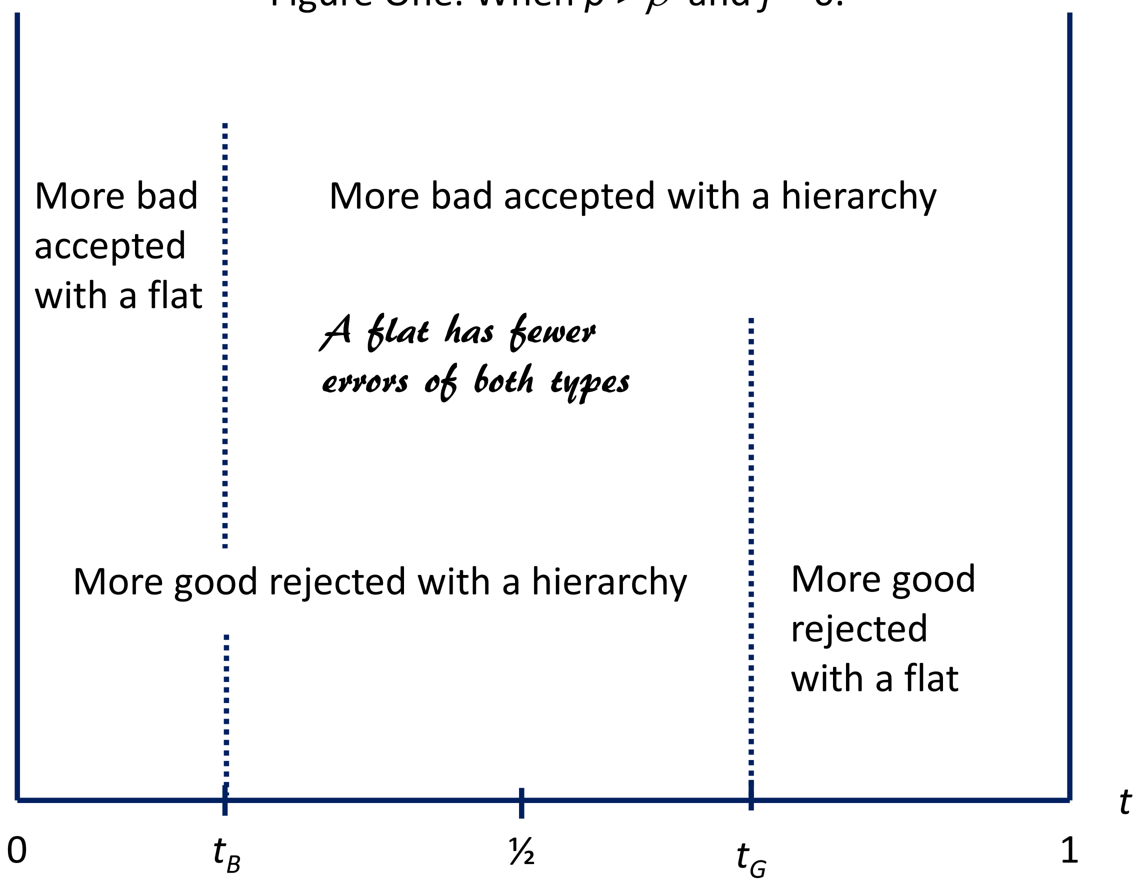


Table One. When a flat structure has fewer errors of both types than a hierarchy ($t_B < t < t_G$) when there is no bias (f = 0).			
p	ρ	t_B	t_G
.9	.8	.308	.692
.9	.7	.206	.794
.9	.6	.143	.857
.8	.7	.368	.632
.8	.6	.273	.727
.7	.6	.391	.609

Table Two. Values for t_B and t_G.				
p	ρ	***f***	t_B	t_G
.9	.8	.1	.484	.716
.9	.7	.1	.354	.813
.9	.6	.1	.329	.871
.8	.7	.1	.476	.661
.8	.6	.1	.368	.752
.7	.6	.1	.468	.643
.9	.8	.2	.609	.742
9	.7	.2	.476	.831
.9	.6	.2	.361	.885
.8	.7	.2	.568	.692
.8	.6	.2	.458	.778
.7	.6	.2	.541	.679
.9	8	.3	.701	.769
.9	.7	.3	.578	.851
.9	.6	.3	.468	.899
.8	.7	.3	.647	.725
.8	.6	.3	.541	.804
.7	.6	.3	.605	.715

is relatively small unless there is a significant difference in the likelihood of a correct assessment by the committees.

I focus on the case when $t_B < t_G$ and f is relatively small (if not zero). I do so because I believe it is likely that $p > \rho$, and, at least for universities that have a reputation for quality faculty, f is not significant. It would be difficult for schools to acquire a good reputation if they frequently tenured individuals because they liked them, and not because they were good scholars.

However, the possibility remains that $\rho > p$. In that case, Figure Two shows we simply reverse the previous results in this section. Then there would exist a range of t in which a hierarchy has fewer errors of both types. When there is no bias, the results are precisely the mirror image of when $p > \rho$. If p and ρ were switched in Table One, the values for t_B and t_G would also switch.

5. Extensions

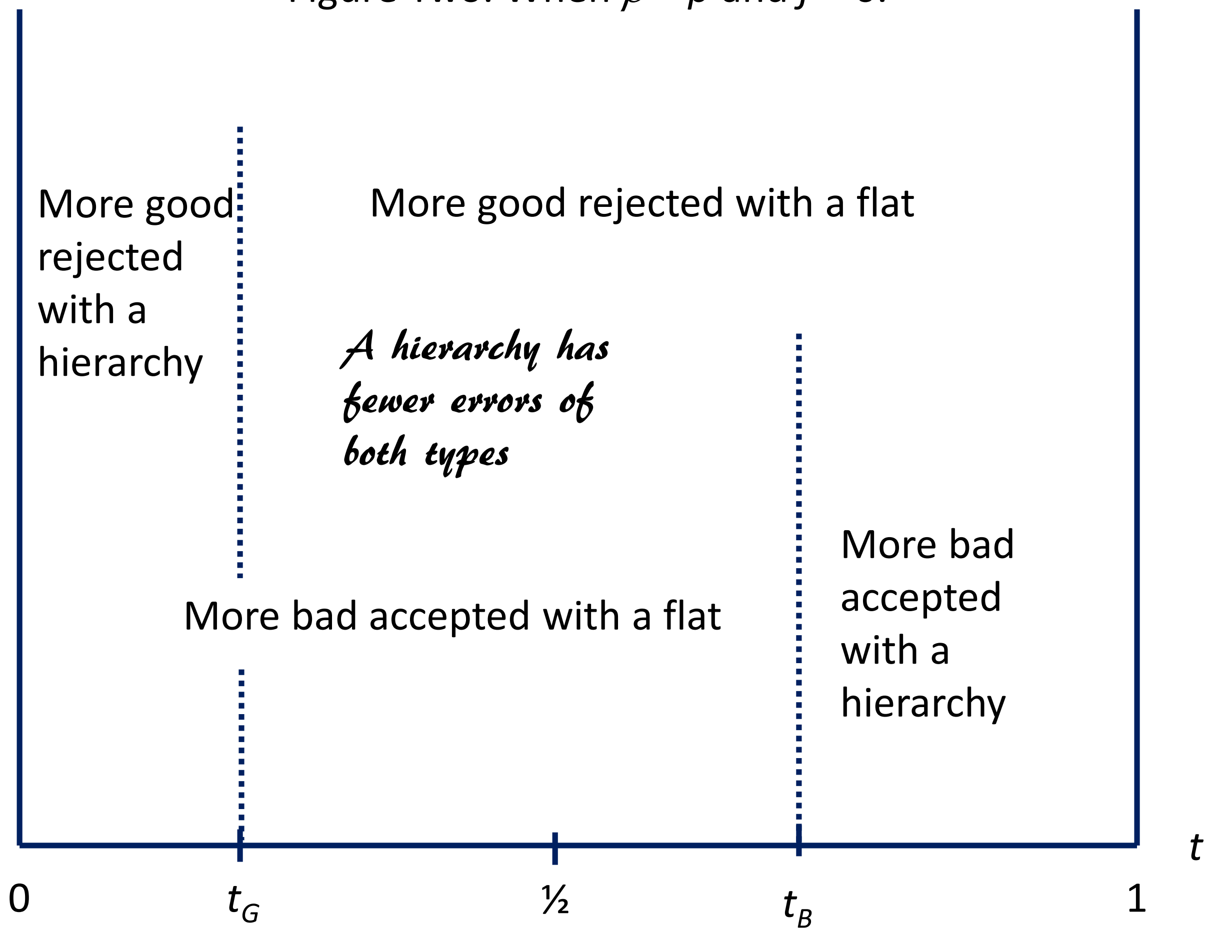
Derivations of proofs for this section are contained in the Appendix.

A. The department committee is (sort of) supreme.

When there is a split decision from the committees, suppose the administration only grants tenure if the department recommends tenure. If the administration never tenures with a split recommendation when the college recommends the candidate, adding the college committee cannot increase the number of bad candidates accepted. Thus, $t_B = 1$.

In my general model (Section Three), there could be more RGs with a flat structure than with a hierarchy given the possibility, with a hierarchy, of rejection of a good candidate by the

Figure Two. When $\rho > p$ and $f = 0$.



department, acceptance by the college, and the administration tenuring the candidate. The latter possibility is assumed away in this case. Relative to my general model, fewer good candidates are accepted with a hierarchy. Thus, $t_G = 1$. A hierarchy always rejects more good candidates, unless $t = 1$ and both structures reject good candidates at the same rate.

If the administration never sides with the college committee when there is a split between the department and college committees, then the second chance aspect with the hierarchy no longer exists. Thus, there is no possibility of reversing the Shah-Stiglitz results: a flat structure always accepts more bad candidates and rejects fewer good candidates than would a hierarchy. If $t_B = t_G = 1$, then universities with the same objective (*e.g.*, they wish to minimize ABs and not RGs) would choose the same structure. However, evidence presented in Section Six is that comparable universities do not choose the same structure, which suggests that the department committee is *not* supreme.

B. The college committee is (sort of) supreme.

In this case, results depend on the relative values of p and ρ. Now suppose the administration never tenures one if the department committee said yes when the college committee said no. Therefore, an acceptance by the department can only result in a tenuring if the college committee concurs, lowering ABs with a hierarchy relative to when split committees are viewed the same by the administration.

However, we still can have $t_B < 1$. As before, an AB occurs if the department committee says no, the college committee says yes, and the administration agrees with the college, increasing the possibility of an AB with a hierarchy versus a flat structure. Now $\text{prob}(AB|2)_{t=1} > \text{prob}(AB|1)$ if $p(1 - f) > \rho$. Thus, a necessary condition for

$\text{prob}(AB|2)_{t=1} > \text{prob}(AB|1)$ is $p > \rho$. If $p < \rho$, $\text{prob}(AB|2)_{t=1} < \text{prob}(AB|1)$ and $t_B = 1$: a flat always accepts more bad candidates than a hierarchy. If $p(1 - f) > \rho$, we have:

$$t_B = \frac{\rho[f+(1-f)(1-p)]}{p(1-f)(1-\rho)}. \tag{13}$$

If $f = 0$, $t_B = \frac{\rho(1-p)}{p(1-\rho)} < 1$ with $p > \rho$. In general, a larger $p(1–f)$ means less likelihood of bias and more accuracy by the department committee: the department committee makes fewer mistakes. A smaller ρ means there is a greater likelihood of the college committee saying yes when the department committee said no, so more mistakes are made with a hierarchy. Thus, it is possible a flat structure accepts fewer bad candidates than a hierarchy would.

For RGs, a favorable vote by the department committee without the concurrence of the college has no chance of going through. Compared to my general model, when neither committee is treated differently, there is less probability of promoting a good candidate with a hierarchy. Thus, I find $t_G = 1$.

If $p(1 - f) > \rho$, then $t_B < 1$, so there is again the possibility that $t_B < t < t_G$. As in my general model, there may be fewer errors of both types with a flat structure. Some examples are illustrated in Table Three for the case when $f = 0$. Assuming $p(1 - f) > \rho$, when the college committee is sort of supreme, there is a non-trivial probability the flat structure will produce fewer errors of both types than would a hierarchy.

Table Three. When a flat structure has fewer errors of both types than a hierarchy ($t_B < t < t_G$), there is no bias (f = 0), and the college committee is (sort of) supreme.			
p	ρ	t_B	t_G
.9	.8	.296	1
.9	.7	.259	1
.9	.6	.167	1
.8	.7	.583	1
.8	.6	.375	1
.7	.6	.643	1

As in my general model, when $p(1 - f) > \rho$, and the college committee is (sort of) supreme, we have $t_B < t_G$. In this case, as discussed above, we can have universities choose different structures even if they have similar objectives.

C. Department committee versus the chair

Now ignore a committee other than the one in the department, and consider the chair having an independent recommendation. It is possible a chair may be less qualified to judge a candidate's research than members of the department promotion and tenure committee. Also, a chair may not be as close to the candidate as are other department members, and so may not be as inclined to be favorably biased towards the candidate. However, relative to those outside a department, the chair should be more informed about and more acquainted with the candidate. Thus, I assume the chair and the department committee have the same probability of making a correct decision, p, and the same probability of bias, f. If the department committee and chair have different recommendations, as before, it is assumed the administration only grants tenure t of the time.

Since, if $f = 1$, all are promoted with either structure, I only consider the case when $f < 1$. I find $t_B = t_G = ½$. This is the same result as in my general model when the department and college committees have the same probability of making the correct decision ($p = \rho$), and there is no bias by the department ($f = 0$). Thus, when both evaluators have the same accuracy and bias, their bias cancels. As before with the department and college committees, when $p = \rho$ and $f = 0$, the Shah-Stiglitz results are reversed if the probability the administration tenures a candidate (when there is a split between the evaluators) exceeds 50%. Then a flat structure is less likely to accept a bad candidate, and more likely to reject a good candidate than is a hierarchy. Therefore, if it is likely that $t < ½$, and that universities fear ABs more than RGs, then it is optimal to have the department chair have input in the tenure decision.

6. Evidence and conjectures

Hiring good faculty is important. Evidence from evolutionary biology departments is that hiring a star has large positive impact, particularly on the quality of subsequent hires (Agrawal *et al*., 2014). Agrawal *et al*. cite Robert Lucas (1988) on the importance of getting good quality colleagues.

"Certainly in our profession, the benefits of colleagues from whom we hope to learn are tangible enough to lead us to spend a considerable fraction of our time fighting over who they shall be, and another fraction travelling to talk with those we wish we could have as colleagues…"[20]

James Heckman had this observation on hiring economists at the University of Chicago:

"…mistakes were made, but if anything over most of the period mistakes were in NOT appointing people, not in appointing people."[21]

Thus, Heckman claimed that his department made more RGs than ABs. In tenure decisions, one might expect most departments to care more about ABs than RGs. Although departments do not wish to fail to hire a star, failure to hire a good candidate can be rectified by hiring another good person in the future. Tenuring a bad candidate is more costly. A scarce faculty slot has been filled with someone who may stay for a long time. It is possible that universities that are ranked lower might fear an RG more than an AB because tenuring one who

[20] Lucas (1988), p.38.
[21] Heckman (2014), p.128.

becomes a star could have a big positive impact on such a department. However, at least for universities with top seventy-five economics departments, the evidence does not suggest universities fear RGs more than ABs.

A recent study (McPherson, 2012) ranked U.S. economics departments. In Table Four, I show whether these universities have a committee external to departments[22] that makes recommendations on promotion and tenure. Non-U.S. universities are not considered herein because they may have institutional features that differ from those in the U.S. For all but one university (Cal Tech, ranked number forty-one), I was able to determine if an external committee made recommendations on candidates for tenure and promotion.[23]

For the top seven universities, three---Harvard (number one), UC-Berkeley (number three), and MIT (number four)---*have* external committees. Three of the top seven universities *do not have* external committees---Chicago (number two), Stanford (number five), and Northwestern (number seven). For the other top seven university---NYU (number six)---a dean *may* choose either an external committee, or the dean may request additional outside letters. Essentially one half of the top seven schools do not have an external committee. For the other sixty-seven universities of the top seventy-five for which I have data, only *one*---Duke (number fourteen)---does not have an external committee.

It does not seem likely that only some of the top universities would fear rejecting good candidates more than accepting bad candidates. If ABs are feared by top universities, then the

[22] The top seventy-five economics departments are not necessarily the top seventy-five universities. However, I prefer to use a ranking that is more familiar to economists, one of our own profession. Also, at least the top departments on the list are in universities that are generally highly ranked.

[23] Some departments have more than two committees. I do not distinguish between universities other than whether they have at least one external (to the department) committee. As noted in Table Four, it was difficult to find procedures for some universities, and sometimes policies are not clearly delineated.

evidence is consistent with the prediction of my model that some universities would choose a hierarchy (those with $t < t_B$) and others would choose a flat structure (those with $t > t_B$).

Why do so few universities choose a flat structure? Consider relatively high quality universities.

First, contrary to what I expect, suppose the college committee is more accurate than the department committee ($\rho > p$). Also, suppose there is no bias by the department, ($f = 0$). Then, reversing the numbers for p and ρ in Table One, we have $t_G < ½ < t_B$. A university that is more worried about accepting bad candidates than rejecting good candidates would choose a flat structure only if $t > t_B$. There may not be many universities that have administrators who would grant tenure to someone with a split vote with a probability greater than 50%, so there are few universities with only a department committee.

Second, the same data and some of the same arguments in the preceding paragraph are consistent with the hypothesis that $p > \rho$. If administrators are reluctant to grant tenure when committees are split, t is relatively low. Then, if $p > \rho$, so $t_B < ½ < t_G$, few universities will choose the flat structure even though $t_B < ½$. It is true that t_B is lower in this case than when $\rho > p$, so it is more likely that $t > t_B$ when $p > \rho$ than when $\rho > p$, implying more chance of a flat structure being optimal in the first case. However, I am skeptical that any highly ranked university would have $t > ½$, which is required for universities that fear ABs to choose a flat structure when $\rho > p$. Specifically, is $t > ½$ for Chicago, Stanford, Duke, and possibly NYU? If not, then it is not likely that $\rho > p$.

Additionally, if $p > \rho$, we can explain the evidence under two possible scenarios: when neither committee is treated differently by the administration, and if the college committee is (sort of) supreme, and $p(1 - f) > \rho$. If $\rho > p$, $t_B = t_G = 1$ when the college committee is (sort of) supreme. Then no university that is more concerned with ABs than with RGs would choose a flat structure.[24]

7. Summary

I amend the Shah-Stiglitz (1986) model of optimal organizational structure to account for features that are unique to academia, such as promotion and tenure committees that only recommend, differential ability for and bias by evaluators, and the likelihood that tenuring a bad candidate is a worse outcome than rejecting a good candidate. Without an administration that will grant tenure when promotion and tenure committees have a split recommendation, universities with similar objectives would choose the same structure.

Using positive analysis, my model explains why schools with the same objectives would choose different structures---some with and others without a promotion and tenure committee external to an academic department. The evidence is consistent with the following:[25]

i. universities generally fear accepting bad candidates more than they do rejecting good candidates for tenure (or promotion);

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[24] Suppose t is larger for lower ranked universities. Then it *could* be the case such universities fear RGs more than ABs, and $t > t_G$, so a hierarchy has fewer RGs than a flat structure. Surely, however, *some* universities that fear RGs more than ABs would have $t < t_G$, and choose a flat structure. However, all of the universities ranked below number fourteen have external committees, which is consistent with the argument ABs are feared more than RGs, even for lower ranked universities. I know of universities ranked lower than seventy-five that have no external committee, so it is *possible* they have relatively high values for t, and fear RGs more than ABs. However, these universities could fear ABs more than RGs, and have $t > t_B$, as I argued is likely for the highly ranked universities that have no external committee.

[25] Alternatively, the evidence is consistent with: 1) universities being more concerned with rejecting good candidates (RGs) than they are with accepting bad candidates (ABs), and most universities choosing a hierarchy because 2) $t > t_G$. If $p > \rho$, $t_G > ½$. To make this scenario as likely as possible, we would have 3) $p < \rho$, so $t_G < ½$. I do not find #1 at all likely, and I do not believe that #3 is true. Further, if $f = 0$, switching from $p > \rho$ to $p < \rho$ means what was t_B now equals t_G. Call this value x. Unlike the argument in the text, which depends on t being relatively low for most universities (less than x), for most schools to choose a hierarchy when they are more concerned with RGs than with ABs requires $t > x$. Thus, there is a third reason to question this scenario: it seems unlikely that a highly-ranked university would have an administration that would be relatively inclined to tenure individuals with a split vote from committees.

ii. some universities could accept fewer bad candidates with a flat structure, so $t_B < 1$, and, for universities with a flat structure, $t > t_B$;

iii. t is not too high; thus, not many universities have $t > t_B$; and

iv. the department committee is not supreme; if it were, $t_B = t_G = 1$, and no university that is more worried about accepting bad candidates than rejecting good candidates would choose a flat structure (have no external promotion and tenure committee).

Additionally, if either the department or the external committee is more accurate in judging the quality of candidates for promotion or tenure, there is a non-trivial probability one structure will accept fewer bad candidates *and* reject fewer good candidates. If the department (*resp*., external) committee is more accurate, then we can have fewer errors of both types with a flat (*resp*., hierarchical) structure.

As may be true for some for-profit firms (Lazear, 1995), it is possible some universities do not behave optimally. For them, the model in this paper may be prescriptive. For normative analysis, it is important to answer the question of which department tends to be more accurate. The evidence I have does not allow me to claim without hesitation which committee is likely to be more accurate.

Besides the issue of which committee is more accurate, another policy question is that some colleges within a university likely differ in their heterogeneity. For example, arts and sciences colleges contain hard sciences departments along with humanities. If a department is a more accurate judge of its promotion and tenure candidates than is a college committee ($p > \rho$), and universities fear accepting bad candidates more than rejecting good candidates, then more heterogeneous colleges should have a larger difference between p and ρ. In these colleges, it is more likely a flat structure is the better choice than it would be in colleges in which p and ρ are closer. Therefore, a *university* policy mandating either an external committee or no external committee may not be wise. Rather, a policy like that at NYU---where the dean of a college chooses either an external committee or additional outside letters[26]---may be optimal.

[26] I did not consider outside letters in the analysis herein. Such letters represent information that is available at all levels of academic evaluation, and are thus inputs and not a formal vote as occurs with university committees.

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Table Four-A. Policies of economics departments ranked 1-10.*

University	Has an external committee for tenure and promotion?	Source**
Harvard	Yes	Tenure Track Handbook 2013-2014: http://isites.harvard.edu
Chicago	No	Personal communication from UC faculty member
California-Berkeley	Yes	Academic Personnel (UC Office of the President): http://www.ucop.edu/academic-personnel/academic-personnel-policy/
MIT	Yes	MIT Policies and Procedures: http://web.mit.edu/policies/3/3.2.html
Stanford	No	Stanford University Faculty Handbook: http://facultyhandbook.stanford.edu/
NYU	Maybe***	Promotion and Tenure Guidelines: http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/promotion-and-tenure-guidelines.html
Northwestern	No	Office of the Provost Policy on Tenure and Promotion Standards and Procedures: http://www.northwestern.edu/provost/policies/faculty-promotion-and-tenure/tenure-and-promotion-standards-and-procedures.html
Penn	Yes	School of Arts and Sciences Policies and Procedures for Appointments and Promotion: http://www.sas.upenn.edu/deans-office/faculty/II.html
Columbia	Yes	Principles and Customs Governing the Procedures of *Ad Hoc* Committees and University-Wide Tenure Review: http://www.columbia.edu/cu/vpaa/docs/guideline.html
Yale	Yes	The Report of the Faculty of Arts and Sciences Tenure and Appointments Policy Committee: http://facultyadmin.yale.edu/resources/reappointments-promotions

*Based on McPherson (2012).

**In some cases, it was difficult to find procedures for a university, but policies for a college were found. The policy for the college was imputed to the university. Sometimes policies are not clearly delineated, so the possibility of an error in the findings exists.

***The dean either chooses an external committee or additional outside letters.

Table Four-B. Policies of economics departments ranked 11-20.		
University	**Has an external committee for tenure and promotion?**	**Source**
Michigan	Yes	School of Education Promotion and Tenure Committee: http://www.soe.umich.edu/departments_services/committees/promotion_and_tenure_committee/
Princeton	Yes	Rules and Procedures of the Faculty of Princeton University and Other Provisions of Concern to the Faculty: https://www.princeton.edu/dof/policies/publ/fac/rules_toc/chapter4/
UCLA	Yes	Preparing for Academic Personnel Review: https://www.apo.ucla.edu/
Duke	No	Duke University Faculty Handbook: http://provost.duke.edu/faculty-resources/faculty-handbook/
Cornell	Yes	Faculty Handbook 2010: http://theuniversityfaculty.cornell.edu/handbook/toc.html
Maryland	Yes	University of Maryland 2012-2013 Guidelines for Appointment, Promotion, and Tenure: https://faculty.umd.edu/policies/indexdown.html
Illinois	Yes	Promotion and Tenure. Office of the Provost Communication No. 9: http://www.provost.illinois.edu
UC-SD	Yes	Report of the Committee to Review Trends in Promotion to Tenure: http://senate.ucsd.edu/Committees/CAP/ar9596att2.htm
Wisconsin	Yes	Faculty Policies and Procedures University of Wisconsin-Madison: http://www.secfac.wisc.edu/governance/fpp/Chapter_7.htm#714
USC	Yes	University Committee on Appointments, Promotions, and Tenure. UCAPT Manual March 2013: http://policies.usc.edu

Table Four-C. Policies of economics departments ranked 21-30.		
University	**Has an external committee for tenure and promotion?**	**Source**
Ohio St.	Yes	OAA Policies and Procedures Handbook: http://oaa.osu.edu/policiesprocedureshandbook.html
Minnesota	Yes	Promotion and tenure: overview of annual processes regarding tenure and/or promotion: http://www.academic.umn.edu/provost/faculty/tenure/overview.html
Texas	Yes	General Guidelines for Promotion and Tenure of All Faculty Ranks Fall 2013: https://www.utexas.edu/provost/policies/evaluation/tenure/
UC-Davis	Yes	Academic Personnel Manual APM UCD-220: http://manuals.ucdavis.edu/apm/220.htm
Michigan St.	Yes	Faculty Guide for Reappointment, Promotion and Tenure Review: http://www.hr.msu.edu/promotion/facacadstaff/FacGuideTenure.htm
Carnegie Mellon	Yes	Appointment and Tenure Policy of Carnegie Mellon University: https://www.cmu.edu/policies/documents/Tenure.html
Dartmouth	Yes	Guidelines for Appointments, Reappointments, Promotion and Tenure: www.dartmouth.edu
Rochester	Yes	Faculty Handbook: www.rochester.edu
Washington U.	Yes	Arts and Sciences Tenure and Promotion: http://artsci.wustl.edu/about/administration/tenure-and-promotion
Penn State	Yes	Administrative Guidelines for HR-23: Promotion and Tenure Procedures and Regulations: http://www.psu.edu/vpaa/promotion.htm

Table Four-D. Policies of economics departments ranked 31-40.		
University	**Has an external committee for tenure and promotion?**	**Source**
Iowa State	Yes	Promotion and Tenure Review Process: Guidelines: http://www.provost.iastate.edu/help/promotion-and-tenure
North Carolina-Chapel Hill	Yes	Tenure and Promotion at Carolina: A Quick Guide for New Faculty: https://cfe.unc.edu/pdfs/tenure_promotion.pdf
Boston U.	Yes	College of Arts and Sciences Guide to the Tenure and Promotion Review Process: http://www.bu.edu/cas/faculty-staff/faculty-staff-handbook/faculty-personnel-issues/tenure-and-promotion-policies-and-practices/cas-guide-to-the-tenure-and-promotion-review-process/
Vanderbilt	Yes	Promotion and Tenure at Vanderbilt: P&TSession07-1.pdf
Brown	Yes	On the Matter of Standards in Tenure and Promotion: Standards in Tenure and Promotion: http://www.brown.edu/about/administration/dean-of-faculty/tenure-and-promotion
Boston College	Yes	The University Statutes: http://www.bc.edu/content/bc/offices/ bylaws/statutes.html
Texas A&M	Yes	College of Liberal Arts Review, Tenure and Promotion Procedures (2012). Tenure_and_Promotions_Guidelines_CLLA.pdf: https://dof.tamu.edu/node/23
UC-Irvine	Yes	Advancement and Promotion at Irvine: A Handbook of Advice for Tenure-Track and Tenured Faculty: www.ap.uci.edu/Guides/faculty/FacultyHandbook.pdf
Purdue	Yes	Office of the Provost: West Lafayette Campus Promotion and Tenure Policy. Tenure Policy WL Campus fv - 2013-14AY.pdf: http://www.purdue.edu/provost/faculty/promotion.html
Arizona	Yes	Associate Provost for Academic Affairs Promotion an Tenure: http://facultyaffairs.arizona.edu/promotion#prom_and_tenure

Table Four-E. Policies of economics departments ranked 41-50.		
University	**Has an external committee for tenure and promotion?**	**Source**
Cal Tech	?****	
Virginia	Yes	University of Virginia Policy: Promotion and Tenure: https://policy.itc.virginia.edu/policy/policydisplay?id=PROV-017
Indiana	Yes	Guidelines for Tenure and Promotion Reviews Office of the Vice Provost for Faculty & Academic Affairs February 28, 2013: www.indiana.edu
Georgetown	Yes	Guidelines for Submissions of Rank and Tenure Applications: http://www.georgetown.edu/about/governance/rank-and-tenure-committee/applications/index.html
Emory	Yes	Principles & Procedures for Promotion & Tenure: http://college.emory.edu
Arizona St.	Yes	The Promotion and Tenure Process: Policies, Procedures, and Best Practices: https://provost.asu.edu/promotion_tenure
George Mason	Yes	George Mason University Faculty Handbook: www.gmu.edu
Georgia St.	Yes	GSU Promotion and Tenure Manual for Tenured and Tenure-Track Professors: http://www2.gsu.edu
Pitt	Yes	Faculty Appointments, Reappointments, Nonrenwals, Promotions, and Conferrals of Tenure: http://www.provost.pitt.edu/memo/faculty_personnel_actions.htm
Rutgers	Yes	Academic Appointments Manual: Evaluation, Reappointment and Promotion: http://ruweb.rutgers.edu/oldqueens/FACpromotions.shtml

**** The university’s faculty handbook is only accessible with a password, and no response was received to a query to the provost’s office regarding promotion and tenure policies.

Table Four-F. Policies of economics departments ranked 51-60.		
University	**Has an external committee for tenure and promotion?**	**Source**
U. of Washington	Yes	Promotion & Tenure Policy & Procedure: http://ap.washington.edu/ahr/resources/tenure-promotion/
Colorado	Yes	Reappointment, Tenure, and Promotion of Tenure Rank Faculty: https://facultyaffairs.colorado.edu/faculty/reappointment-promotion-and-tenure/reappointment-of-tenure-rank-faculty
Syracuse	Yes	Faculty Manual: http://provost.syr.edu/faculty-support/faculty-manual/
Iowa	Yes	College of Liberal Arts & Sciences Faculty Appointments & Review: http://clas.uiowa.edu/faculty/faculty-appointments-review-clasui-procedures-promotion-and-tenure-decision-making
Notre Dame	Yes	Office of the Provost: http://provost.nd.edu/
Georgia	Yes	Guidelines for Appointment, Promotion and Tenure: www.uga.edu
North Carolina St.	Yes	Guide to NC State's Promotion and Tenure Process: http://www.provost.ncsu.edu/promotion-tenure/Guide_Promotion_and_Tenure.php
Houston	Yes	Promotion and Tenure: http://www.uh.edu/provost/faculty-resources/fac-guidelines-docs-forms/prom-ten/index.php
UC-Santa Barbara	Yes	Faculty Handbook: https://ap.ucsb.edu/handbook/
Rice	Yes	2012-2013 Promotion and Tenure: http://professor.rice.edu/Template_FacultySenate.aspx?id=2147484186

Table Four-G. Policies of economics departments ranked 61-70.		
University	**Has an external committee for tenure and promotion?**	**Source**
UC-Santa Cruz	Yes	UC Santa Cruz Non-tenured Faculty Handbook.AHRhandbooktext_finalv2008.pdf: http://apo.ucsc.edu
Johns Hopkins	Yes	Appointment and Promotion Procedures for Tenure Track Faculty In The Krieger School of Arts and Sciences and The Whiting School of Engineering: AppointmentPromoProsedures110712.pdf
SMU	Yes	Procedures for the Evaluation of Faculty Members for Tenure, Promotion, and the Extension of Contract: Promotion and Tenure Policies and Procedures-1.pdf
Oregon	Yes	Promotion and Tenure: http://academicaffairs.uoregon.edu/promotion-tenure
Florida	Yes	Guidelines and Information Regarding the Tenure, Permanent Status and Promotion Process for 2013-2014: http://www.aa.ufl.edu/tenure/
Florida State	Yes	2013-2014 Promotion and Tenure Process: PTmemo13.pdf: http://provost.fsu.edu/faculty/tenure/
VPI	Yes	Annual Follow-Up on Promotion and Tenure Reviews: http://provost.vt.edu
Missouri	Yes	320.035 Policy and Procedures for Promotion and Tenure: http://www.umsystem.edu/ums/rules/collected _rules/faculty/ch320/320.035_policy_and_ procedures_for_promotion_and_tenure
Tufts	Yes	Tenure and Promotion Committee: http://ase.tufts.edu/faculty/committees/ASE/ tenurePromotion/2012-2013.htm#description
BYU	Yes	Report: Academic Freedom and Tenure: Brigham Young University, ACADEME September-October 1997:

Table Four-H. Policies of economics departments ranked 71-75.		
University	**Has an external committee for tenure and promotion?**	**Source**
George Washington	Yes	The George Washington University Faculty Code: www.gwu.edu
Kentucky	Yes	Faculty Development Promotion and Tenure: www.uky.edu
Connecticut	Yes	Promotion, Tenure, and Reappointment: http://provost.uconn.edu/promotion-tenure-and-reappointment-ptr/
Texas-Dallas	Yes	General Standards and Procedures Faculty Promotion Reappointment and Tenure: http://policy.utdallas.edu/UTDPP1077
Claremont-McKenna	Yes	Claremont McKenna College Faculty Handbook: https://www.claremontmckenna.edu/dof/FacultyHandbook.pdf

Appendix

The effect of bias (f) on $t_G - t_B$ when $p > \rho$.

We have $\frac{\partial(t_G - t_B)}{\partial f} = \rho(1-\rho)z$, where $z \equiv \left(\frac{1-p}{x} - \frac{p}{y}\right)$, $x \equiv \{f(1-\rho) + [1-f][p(1-\rho) + \rho(1-p)]\}^2$, and $y \equiv [p + \rho - 2p\rho(1-f) - pf]^2$. Now $\frac{\partial(t_G - t_B)}{\partial f} < 0$ if $z < 0$.

If $f = 0$, $x = y = (p + \rho - 2p\rho)^2$, and, with $p > ½$, $z < 0$.

If $f = 1$, $x = (1-\rho)^2$, and $y = \rho^2$. This reduces to $z < 0$ if $\rho^2(1-2p) < p(1-2\rho)$, which is clearly true.

Thus, $\frac{\partial(t_G - t_B)}{\partial f} < 0$ at the extreme values for f, but it has not been proven that the derivative is negative $\forall f$.

The department committee is (sort of) supreme.

Now prob(AB|1) is the same as before = $f + (1-f)(1-p)$, but
prob(AB|2) = $[f + (1-f)(1-p)][1-\rho + t\rho]$.

We have prob(AB|2)$_{t=0}$ = $[f + (1-f)(1-p)][1-\rho]$ < prob(AB|1)---exactly as before.

However, prob(AB|2)$_{t=1}$ = $[f + (1-f)(1-p)$ = prob(AB|1). Since prob(AB|2) clearly increases in t, for $t < 1$, prob(AB|1) > prob(AB|2). Thus, $t_B = 1$: a flat always accepts more bad candidates (unless $t = 1$).

Now prob(RG|1) is the same as before, equal to $(1-f)(1-p)$.
Also, prob(RG|2) = $(1-f)(1-p)(1-\rho) + p(1-f)(1-\rho)(1-t) + \rho(1-p)(1-f) + f(1-\rho)(1-t)$.
The third term in prob(RG|2) is different than before: if the department rejects a good candidate, and the college accepts the candidate, the administration always rejects the candidate.

Now prob(RG|2)$_{t=0}$ = $(1-f)(1-p)(1-\rho) + p(1-f)(1-\rho) + \rho(1-p)(1-f) + f(1-\rho)$. We have prob(RG|2)$_{t=0}$ > prob(RG|1) if $[1-\rho][p(1-f) + f(1-\rho)] > 0$, which is true.

Also, prob(RG|2)$_{t=1}$ = $(1-f)(1-p)$ = prob(RG|1). With prob(RG|2) decreasing in t, for $t < 1$, prob(RG|2) > prob(RG|1).Thus, $t_G = 1$

The college committee is (sort of) supreme.

From before prob(AB|1) = $f + (1-f)(1-p)$. Now prob(AB|2) = $[f + (1-f)(1-p)][1-\rho] + p(1-f)(1-\rho)t$.

We have prob(AB|2)$_{t=0}$ = $[f + (1-f)(1-p)][1-\rho]$ < prob(AB|1).

Also, prob(AB|2)$_{t=1}$ = [f + (1-f)(1-p)][1-ρ] + p(1-f)(1-ρ) = 1-ρ.
Now prob(AB|2)$_{t=1}$ > prob(AB|1) if $p(1-f) > \rho$. Otherwise, prob(AB|2)$_{t=1}$ < prob(AB|1) and $t_B = 1$: a flat would always accept more bad candidates than a hierarchy. If $p(1-f) > \rho$, we have $t_B < 1$ (*eq*.(13) in the text).

As was the case before, prob(RG|1) = (1-f)(1-p). Now
prob(RG|2) = (1-f)(1-p)(1-ρ) + p(1-f)(1-ρ) + ρ (1-f)(1-p)(1-t) + f(1-ρ) = 1-ρ +ρ(1-f)(1-p)(1-t).

Thus, prob(RG|2)$_{t=0}$ = 1-ρ +ρ(1-f)(1-p), which exceeds prob(RG|1) if(1-f)(1-p) < 1, which is true.

Also, prob(RG|2)$_{t=1}$ = 1-ρ > prob(RG|1) if $p - \rho + f(1-p) > 0$, which also is true if $p \geq \rho$. With prob(RG|2) linear in t, prob(RG|2) > prob(RG|1) $\forall t$, so $t_G = 1$: more good candidates are rejected with a hierarchy than with a flat structure.

Department committee vs. the chair.

Now prob(AB|1) = f + (1-f)(1-p). To determine prob (AB|2), consider the following probabilities.

- Both are biased and accept the candidate: the probability is f^2.

- One is biased, the other is not, and the unbiased agent makes a mistake (there are two ways this can happen): the probability is $2f(1-f)(1-p)$.

- One is biased, the other is not, the unbiased agent gets it right (rejects the candidate), and the administration accepts the candidate (there are two ways this can happen): the probability is $2fpt(1-f)$.

- Neither is biased, one makes a mistake, and the administration accepts the candidate (there are two ways this can happen): the probability is $2(1-f)^2(1-p)pt$.

- Neither is biased and both make a mistake: the probability is $(1-f)^2(1-p)^2$.

Simplifying, Prob(AB|2) = $f^2 + 2f[1-f][1-p(1-t)] + 2pt(1-p)(1-f)^2 + (1-f)^2(1-p)^2$.

If $t = 0$, we have prob(AB|2)$_{t=0}$ = $f^2 + 2f(1-f)(1-p) + (1-f)^2(1-p)^2$. Now
prob(AB|2)$_{t=0}$ < prob(AB|1) if $p(1-f) < 1$, which is true.

Also, prob(AB|2)$_{t=1}$ = $f^2 + 2f(1-f) + 2p(1-p)(1-f)^2 + (1-f)^2(1-p)^2$, and
prob(AB|2)$_{t=1}$ > prob(AB|1) if $p(1-f) < 1$, which again is true. The value of t for which prob(AB|1) = prob(AB|2) is $t_B = ½$.

Now prob(RG|1) = (1–f)(1-p). To determine prob(RG|2), consider the following probabilities. Note, if both are biased, they do not reject a candidate.

• Neither is biased, one gets it right, the other gets it wrong, and the administration does not support a favorable decision (there are two ways this can happen): the probability is $2p(1–p)(1–t)(1–f)^2$.

• Neither is biased and both get it wrong: the probability is $(1–f)^2(1–p)^2$.

• One of the two is biased, the unbiased one gets it wrong, and the administration does not support the candidate (there are two ways this can happen): the probability is $2f(1–f)(1–p)(1–t)$.

Thus, $\text{prob(RG|2)} = [1- f]^2[2p(1–p)(1–t) + (1–p)^2] + 2f(1–f)(1–p)(1–t)$.

If $t = 0$, $\text{prob(RG|2)}_{t=0} = [1–f]^2[2p(1–p) + (1–p)^2] + 2f(1–f)(1–p)$. Now $\text{prob(RG|2)}_{t=0} > \text{prob(RG|1)}$ if $f + p(1–f) > 0$, which is true.

If $t = 1$, $\text{prob(RG|2)}_{t=1} = (1–f)^2(1–p)^2 < \text{prob(RG|1)}$. The value of t for which $\text{prob(RG|1)} = \text{prob(RG|2)}$, is $t_G = ½$.