Editorial Favoritism

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PRELIMINARY AND INCOMPLETE

> "I have had papers turned down, but very few economics papers. Most of my economics papers have been published by journals edited by close friends, and in many of these cases there weren't even formal submissions." Judge Richard Posner (quoted by Gans and Shepherd, Journal of Economic Perspectives, 1995)

I. Introduction

It is hard to find an economist (or doubtless a scholar in another field) who lacks an opinion on the subject of editorial favoritism. Anecdotes abound and passions are high, particularly among those (like me) who are not associated with the elite institutions of our profession. There is a sense among many that favoritism is getting worse, that elite journals are increasingly inaccessible to those "outside the club," and that editors from elite institutions give their students and peers opportunities in the elite journals that would never be available to outsiders (Bardhan, 2006). Is this just the grumbing of frustrated, jealous and perhaps undeserving authors? Or is editorial favoritism actually being exercised? If there is favoritism, is it a bad thing? Does it imply that lower quality papers are occupying the scarce space of the top journals? Does it imply that academic incentives for high quality research are impaired (for the unfavored)?

In this paper, I attempt to address some of these questions by constructing theory to explain the practice of editorial favoritism. The theory permits us to identify forces that may drive editorial favoritism, as well as its effects on (i) authors in different (favored vs. unfavored) groups, (ii) the production of high quality research papers, and ultimately, (iii) economic welfare derived from the publication process. It also delivers some insights into the nature of an editorial process driven by virtuous and optimizing editors, including the process by which referees are chosen and the extent to which editors scrutinize referee recommendations

Despite apparent professional interest in editorial favoritism – at least judging from the popularity of conversation on the subject – there has been strikingly little related research. To my knowledge, this is the first effort to attack the subject on a theoretical level. In doing so, I build on the key work of Ellison (2002a), who provides the first coherent model of the editorial process. I thus borrow a number of features of Ellison's model, including his distinction between two quality attributes of author papers (q and r) that are the result of author effort (although I provide somewhat different interpretations to these attributes). I also borrow Ellison's posited criterion for an Editor's decision-making. Crucially, however, my models differ from Ellison's in order to focus attention on prospects for editorial discrimination between different groups of authors and referees. Ellison is interested in the lengthening of the review process and evolving standards for article attributes (including length, citation of references, etc.), and thus focuses on standards for paper revisions; as a result, he does not model different author/referee groups that are, of course, central to my inquiry. In essence, Ellison abstracts from any heterogeneous treatment that might arise in the editorial process because this is not his main focus, whereas I abstract from the revision process because this is not my main focus.

In this paper, I do not provide empirical evidence on the presence or absence of editorial favoritism per se. However, the theory has implications for how one might go about testing for the presence of favoritism. Current evidence on this subject is mixed. Casual empiricism is suggestive, but certainly far from conclusive (Bardhan, 2006). As indicated in Table 1, the top three American economics journals have recently seen an increase in the concentration of authors from top institutions. This increase is particularly noticeable for the *Quarterly Journal of Economics*, where the top four institutions accounted for over 43 percent of pages during the 2000-2003 period, with Harvard and MIT authors alone responsible for over 28 percent of pages; these percentages appear to represent historic highs.

However, current econometric evidence – admittedly indirect – does not confirm the presence of favoritism. For example, in her study on the effects of double-blind vs. single-blind reviewing in the AER, Blank (1991) compares impacts on authors from institutions of different rank. One might expect, if there is editorial favoritism exercised by referees, that double-blind reviewing would reduce acceptance rates for top ranked institutions and raise them (at least relatively speaking) for lower ranked institutions. Blank's conclusions are mixed on this front. Authors from the very top ranked institutions saw no decline in their acceptance rates as a result of double-blind treatment. However, authors from middle-ranked institutions (rank 6-50) saw significant reductions in acceptance rates, while authors from lowest-ranked institutions (rank over 50) saw no significant reduction. There is, of course, the potential for the Editor – as well as the referees – to play a role in providing more favorable editorial treatment to high rank institution; this role may conceivably explain the failure of double-blind reviewing to affect AER acceptance rates for authors from the highest rank institutions. This role for the Editor is also crucial in the theory developed in this paper.

In a famous paper, Laband and Piette (LP, 1994) provide more direct evidence on editorial favoritism. The authors posit two competing arguments about the relationship between paper quality and an author's ties to editorial decision-makers. The first is that editorial favoritism (due to author/editor ties) leads to lower quality papers; specifically, "Editors may publish substandard papers written by their personal friends or professional allies" (LP, 1994). The second is that Editors seek out high quality papers, implying an opposite direction of effect: author/Editor ties will lead to higher quality papers. LP provide an empirical test of these competing predictions by examining the effect of author / editorial board ties on an article's subsequent citations (the presumed measure of article quality) using a cross section of 1051 articles in 28 economics journals in 1984. In more recent work, Medoff (2003) provides a similar test, with important twists, using a cross-section of 359 articles in 6 core economics journals in 1990. Both of these papers find evidence of a significant positive relationship between an author's connection with editorial decision-makers and subsequent citations. These results are interpreted as evidence against editorial favoritism.[1]

[1] Ellison (2002b) studies whether the review process in top economics journals has become more democratic over time, which might explain longer publication lags. One potential indicator of favoritism (an undemocratic process) is reduced submit-accept times for high status authors. Ellison finds no statistically significant links between indicators of author status in any of the past three decades (1970's,

The theory in the present paper, however, predicts that favored groups will supply higher quality papers; this is (at least in part) precisely because these groups are favored and, as a result, enjoy higher rewards to quality production. The evidence of LP and Medoff (2003), therefore, is consistent with the editorial favoritism characterized below.[2]

In what follows, I develop two (related) models of favoritism. The first is a model of statistical discrimination in which two groups have different distributions of author ability. Higher ability authors can produce higher quality papers with less cost. In the model, editors and referees have imperfect information about paper quality, but know an author's group. Referees provide a signal of one aspect of quality, and editors accept papers which have the highest estimated quality. In the equilibrium, quality hurdles for publication are higher for the disadvantaged group (that with the inferior distribution of ability). Here the discrimination is driven by higher estimated production of unobvserved quality attributes by the favored group. Such discrimination is akin to statistical discrimination in labor and insurance markets (see, for example, Milgrom and Oster, 1987). The model enables us to study effects of tightening journal standards – due to increased demand for scarce journal space – on the extent of favoritism, as well as the effect of the favoritism on the production of "high impact" papers (arguably the most important component of economic welfare derived from the publication process). I find that tightening standards over time lead to an increased extent of editorial favoritism; however, favoritism is, under some conditions, salutary in that it leads to greater numbers of high impact papers.

In a second model, there is no basis for statistical discrimination as authors in both groups have identical abilities. However, referees from the two groups can differ in the extent to which they are "tough" or "kind." In this model, the Editor makes accept/reject decisions based on both a referee's recommendation to reject, and the referee's assessment of paper quality. When a referee's propensity to be tough increases with the likelihood of rejection, and the Editor chooses the proportion of each group's papers to send to referees from the same group, I find that an asymmetric equilibrium can arise even though the two groups are identical apriori; in this equilibrium, one group is subject to a higher quality hurdle for publication than is the other; has a higher proportion of tough reviewers; and is more subject to its own group's tough reviewers. In this setting – in contrast to that with statistical discrimination – editorial favoritism is, under plausible conditions, no longer salutary in the sense that it leads to smaller numbers of high impact papers (vis-à-vis a symmetric outcome with no editorial discrimination). Also interesting are implications of this model for an Editor's optimal rules for editorial management. Not only will an Editor tend to favor the "kinder" group by sending more of its authors' papers to its own group's referees; he or she will also tend to give these

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'80's, and '90's). For the 1990's, however, he does estimate a negative relationship between three key indicators of author status and publication lags.

[2] There is quite a rich empirical literature on various aspects of the editorial process, including work on the slowdown of economics publishing (Ellison, 2002b), the referee process and anecdotes of luminaries (Gans and Shepherd, 1995; Hammermesh, 1994; Laband, 1990), changes in article quality over time (Laband, Tollison, and Karahan, 2002), trends in topical coverage and coauthorship (Laband and Wells, 1998), impacts of author order on article quality (Joseph, Laband and Patil, 2005), intellectual collaboration and coauthorship (Laband and Tollison, 2000). See also Azar's (2005) recent paper arguing that the slowdown in the referee process can be beneficial, essentially because it deters frivolous submissions to high tier journals.

authors the benefit of the doubt in two senses: he/she will reevaluate negative recommendations of "tough" group referees *more* often for "kind" group authors than for "tough" group authors; and he/she will reevaluate positive recommendations of "tough" group referees *less* often for "kind" group authors than for "tough" group authors.

II. Theory 1

A. Model 1

There are two journals, one high tier (H) and the other low tier (L). Payoffs to publication are higher in H (more later). Authors each write one paper per period, and choose two quality attributes of their paper.

The first quality attribute, r, affects the likelihood of publication; referees observe a signal of this attribute in the review process. The r attribute may incorporate innovation on the existing literature, quality of exposition, robustness of empirical findings, generality of theoretical results, the scope of exposited extensions, and so on.

The second quality attribute, q, reflects fundamental and deep innovativeness that ultimately will determine the extent to which the paper influences the state of knowledge and thought within the broader profession. This attribute is assumed to be unobservable at the time of paper submission (although inferences can be made from an author's group membership about the likely q investment made by the author). This assumption is motivated by common claims and perceptions that the innovativeness of the most innovative papers is not appreciated in the referee process (see Gans and Shepherd, 1995).[3] In the future, papers will become high impact or not, with a probability that depends upon both the outlet in which the paper is published and the author's investment in q quality. High (long term) impact is rewarded in the academic marketplace. The probability of high impact, for a paper published in the H (L) journal, is f(q, H) (f(q,L)). H publication increases the likelihood of "discovery": $f(q,H) > f(q,L)$, $f_q(q,H) > f_q(q,L) > 0$, $f_{qq}(q,t) \le 0$.

Author (utility) payoffs from publication in H and L journals are U_H and U_L, respectively, where $U_H > U_L$ (there is a higher payoff to H publication). In addition, if a paper becomes high impact, the present value author payoff is U_q. Hence, in total, we have

$$\text{Utility to H publication} = U_H + f(q,H)\, U_q = U^{H*}.$$
$$\text{Utility to L publication} = U_L + f(q,L)\, U_q = U^{L*}.$$

Because the payoff to H publication is higher, all authors first submit their paper to H, and then if rejected, submit to L.

Authors each have an ability a, which takes one of two possible values, $a \in \{l,h\}$; l denotes low ability and h denotes high ability. An author's cost of quality (in utility units) is c(q,r,a), which is assumed increasing and concave in (q,r). Higher ability lowers the cost of quality: $c_a<0$, $c_{ra}<0$, $c_{qa}<0$.

Each author is in one of two groups, indexed 0 (for "out of network") and 1 (for "in network"). The fraction of high ability authors in group $i \in \{0,1\}$ is $\gamma_i \in (0,1)$. The in-network group is assumed to have a higher fraction of high ability members, $\gamma_1 > \gamma_0$. For example, one may think of the "in-network" group as the set of talented Ivy League scholars. The number of authors in group $i \in \{0,1\}$ is N_i.

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[3] For example, Graciella Chichilnisky writes (Gans and Shepherd, 1995): "The more innovative and interesting the paper, the more likely it is to be rejected, in my experience."

Turning to the editorial process, first consider the low tier (L) journal. Because our primary interest here is in access to the high tier (H) journal, I will treat the low tier editorial process as simply as possible. Specifically, the probability of publication in L is $P_L(r)$, where $P_L'(r) \geq 0$. The idea here is this: There is a given standard of r quality for low-tier journals, but still a review process that yields a risk that the "reported r" from referees does not meet the standard. A higher r reduces this risk. As the number of authors (or other parameters) change, I implicitly assume that the standard does not change, but the supply of low-tier journal space does. Note that, for a relevant range of r, it is likely that r is sufficiently high (due to incentives provided by the H journal) that an author's investment in r quality is irrelevant to L publication, and L journal review is a purely random process. In this case, P_L is a constant, $P_L'=0$.

In the high tier journal (H), space is constrained to a given number of papers. The Editor and referee observe an author's group membership $i \in \{0,1\}$. The referee also observes and reports a signal of r quality, $\tilde{r}$. The Editor then accepts or rejects based on his/her (i, $\tilde{r}$) information. Specifically, for quality q, the Editor has an expectation of the (distribution of) q investments. Let F_i denote the Editor's expectation of the likelihood of "high impact" by an author in group i. In equilibrium, this expectation will be consistent / rational,

(1) $$F_i = \gamma_i f(q_{hi},H) + (1-\gamma_i) f(q_{li},H)$$

where q_{ai} = equilibrium q of author with ability a in group i

For quality r, the referee observes and reports a signal that is correlated with both his/her prior expectation of r quality from the i group, and the "true r":

(2) Referee signal of r quality = $\tilde{r}(r,i,\varepsilon) = \bar{r}_i (1-\delta) + r\,\delta + \varepsilon$,

where ε is a random variable assumed (for simplicity) to be uniform on $[-\underline{\varepsilon},\underline{\varepsilon}]$; $\bar{r}_i$ is the prior expectation of group i r quality; and $\delta \in (0,1]$ measures the extent to which the signal weights the "true r" (vs. the prior expectation of r). In equilibrium, $\bar{r}_i$ is based on consistent / rational expectations,

(3) $$\bar{r}_i = \gamma_i r_{hi} + (1-\gamma_i) r_{li} ,$$

where r_{ai} = equilibrium r of author with ability a in group i.[4]

The Editor selects papers for publication that have estimated expected quality above a standard z. The Editor weights q-quality with $\alpha \in (0,1)$ and r-quality with weight (1-α) (following Ellison, 2002a). Hence, a paper is accepted when

(4) $$\alpha F_i Q + (1-\alpha)\, \tilde{r}(r,i,\varepsilon) \geq z,$$

where Q = quality assignment to "high impact." (4) implies the acceptance criterion,

(5) $$\text{Accept} \Leftrightarrow \tilde{r}(r,i,\varepsilon) \geq \underline{r}_i \equiv [z - \alpha F_i Q]/(1-\alpha)$$
$$\Leftrightarrow \varepsilon \geq - R_i - r\delta,$$

where

[4] It is not important that the author-chosen r is the "true r" or, alternately, that the chosen r generates the "true r" by a random process (Ellison, 2002a). What is important is that the Editor considers the referee report as an estimate of the "true r," and this estimate is correlated with both referee's prior information and the author-chosen r.

(6) $R_i \equiv (1-\delta)\ \bar{r}_i - \underline{r}_i$.

(5) gives the author's probability of acceptance,

(7) $P_H(r,R_i)$ = probability of acceptance in H

$= 1 - G(-R_i-\delta r) = g\ (\underline{\varepsilon} + \delta r + R_i)$,

where G is the distribution function for ε and the last equality is based on the assumed uniform distribution for ε, with $g=(2\underline{\varepsilon})^{-1}$. Note that R_i is the crucial determinant of editorial favoritism here.

In equilibrium, z will be selected to exactly fill the journal,

(8) $$\sum_{i=0}^{1} N_i \{ \gamma_i P_H(r_{hi},R_i) + (1-\gamma_i) P_H(r_{li},R_i) \} = K = \text{journal capacity}$$

where, from (1), (3), (5) and (6),

(9) $$R_i = (1-\delta)[\gamma_i r_{hi} + (1-\gamma_i) r_{li}] - [z/(1-\alpha)] + [\alpha Q/(1-\alpha)] [\gamma_i f(q_{hi},H) + (1-\gamma_i) f(q_{li},H)]$$

The order of the game is as follows: (1) The H Editor sets z (to satisfy (8)). (2) Authors each choose (q,r). (3) All authors submit to H. (4) Referees report $\tilde{r}$ values to the H Editor. (5) The H Editor accepts / rejects according to equation (4). (6) Rejected authors submit to L, where each submitted paper is accepted with probability $P_L(r)$. (7) Nature determines the "high impact" of published papers (as described above). (8) Finally, author utilities are realized.

<u>B. Author Quality Choices</u>

Given an author's R and ability a, his/her choice problem is:

(10) $$\max_{q,r} J(r,q;a,R) = P_H(r,R)(U_H+f(q,H)U_q) + (1-P_H(r,R))P_L(r)(U_L+f(q,L)U_q) - c(r,q,a).$$

Corresponding first order conditions are:

(11) r: $J_r = (\partial P_H/\partial r)(U^{H*}-P_L U^{L*}) + (1-P_H)(\partial P_L/\partial r)\ U^{L*} - c_r = 0$

(12) q: $J_q = U_q \{P_H f_q(q,H) + (1-P_H)P_L f_q(q,L)\} - c_q = 0$

where $U^{t*} = U_t + f(q,t)U_q$ for $t \in \{L,H\}$, and $(\partial P_H/\partial r)=\delta g$.[5] In equation (11), the author trades off marginal benefits of r in increasing the probability of publication in H (which yields the net gain, $U^{H*}-P_L U^{L*}>0$) and L, against the marginal cost of r, c_r. In equation (12), the author trades off the marginal benefit of q in increasing the probability of "high impact" (and associated utility U_q) against its marginal cost, c_q.

Unless r and q are strong substitutes in production ($c_{rq}>>0$), which I will assume is not the case, r and q are complimentary in the sense that

(13) $$J_{rq} = U_q \{\delta g\ f^*_q + (1-P_H)(\partial P_L/\partial r) f_q(q,L)\} - c_{qr} > 0,$$

[5] To ensure positive and bounded solutions to (11)-(12), I assume that, for relevant (r,q,a), $c_r(0,q,a) = c_q(r,0,a) = 0$, $c_r(r^+,q,a)$ and $c_q(r,q^+,a)$ are arbitrarily large for bounded $r^+>0$ and $q^+>0$. For analytical convenience, I also ensure a probability of H publication strictly interior to the unit interval by assuming the following: $\underline{\varepsilon} \geq z/(1-\alpha)$ (implying a positive P_H even when r and q are zero), and $\underline{\varepsilon} \geq \bar{V} + r^+\delta$ (implying $P_H<1$ even when $r=r^+$ and $q=q^+$), where

$$\bar{V} = \delta r^+ - [z/(1-\alpha)] + [\alpha Q/(1-\alpha)]f(q^+,H).$$

Finally, to ensure satisfaction of second order conditions, I assume: (i) $-J_{qq} \geq J_{rq}$, (ii) $-J_{rr} \geq J_{rq}$. Sufficient for (i)-(ii) are strong concavity of c() in (q,r), and relatively small δg (large $\underline{\varepsilon}$)and $f_q(q,L)$.

where $f^*_q = f_q(q,H) - P_L()f_q(q,L) > 0$. Hence, if r is higher, marginal incentives to produce q are higher and vice versa. Why? A higher r leads to a higher probability of publication in H which in turn raises the expected return to q. A higher q yields a higher payoff to publication in H (and L), thereby increasing the incentive to raise publication probabilities by raising r.

Two comparative statics effects are of interest. First, higher ability a implies:

(14a) $$dr/da \overset{s}{=} -J_{qq}J_{ra} + J_{rq}J_{qa} > 0$$

(14b) $$dq/da \overset{s}{=} -J_{rr}J_{qa} + J_{rq}J_{ra} > 0$$

where $J_{qq} \overset{s}{=} J_{rr} < 0$ (from second order conditions), $J_{ra}=-c_{ra}>0$, and $J_{qa}=-c_{qa}>0$.

Lemma 1: Higher ability authors produce higher q and r quality.
For higher ability authors, marginal costs of r and q are lower, favoring higher levels of quality. Complimentarity of r and q in production (eq. (13)) reinforces these direct effects of ability on r and q.

Second is the effect of higher R. Recall that R measures the extent of editorial bias in favor of an author. That is, a higher R – due to an author's group affiliation – implies a higher probability of publication in H.

(15a) $$dr/dR \overset{s}{=} -J_{qq}J_{rR} + J_{rq}J_{qR} = g\,(\partial P_L/\partial r)U^{L*}\ \{U_q\,[P_H f^*_{qq} + P_L f_{qq}(q,L)] - c_{qq}\}$$
$$+\ U_q\, g\, f^*_q\ \{U_q\,[\delta g\, f^*_q + (1-P_H)(\partial P_L/\partial r)f_q(q,L)] - c_{qr}\},$$

(15b) $$dq/dR \overset{s}{=} -J_{rr}J_{qR} + J_{rq}J_{rR}$$
$$= g\, U^{L*}\, U_q\ \{\delta g(\partial P_L/\partial r)f^*_q - (1-P_H)[(\partial^2 P_L/\partial r^2)f^*_q + (\partial P_L/\partial r)^2 f_q(q,L)]\}$$
$$+\ g[c_{rr}U_q f^*_q + c_{rq}(\partial P_L/\partial r)U^{L*}],$$

where $J_{rR} = -\,g\,(\partial P_L/\partial r)U^{L*} \leq 0$, and $J_{qR} = U_q\, g\, f^*_q > 0$. Here, direct and indirect effects may be competing. The direct effect of a higher R on q is positive: A higher R, by raising the probability of H publication, also raises incentives for investment in q. However, the direct effect of a higher R on r can be negative: Suppose that P_L rises with r; then, by increasing the probability of H publication, a higher R will lessen incentives to raise r in order to raise probability of L publication ($P_L(r)$). Moreover, with our assumed uniform distribution for ε, a higher R has no effect on the marginal benefit of r in raising the probability of H publication.[6] Because q and r are complimentary, indirect effects of a higher R can offset direct effects.

Lemma 2. (A) dq/dR is positive if the following (sufficient) conditions hold:

(16) $$P_L'' f^*_q + (P_L')2\, f_q(q,L) \leq 0, \text{ and}$$

(17) $$c_{rr}U_q f^*_q \geq -c_{rq}P_L' U^{L*}.$$

(B) Provided $-J_{qq} \geq J_{rq}$ (as assumed),

(18) $$dr/dR \overset{s}{=} U_q f^*_q - P_L' U^{L*}.$$

For example, if there is a constant probability of L publication ($P_L'=0$), then favorable editorial bias leads to higher levels of q and r, $dq/dR \overset{s}{=} dr/dR > 0$. Similarly, if P_L' is positive, and q incentives are strong in the H journal but weak in the L journal ($f_q(q,L) \approx 0 \approx c_{rq}$ and $U_q f_q(q,H) > P_L' U^{L*}$), then again we have $dq/dR \overset{s}{=} dr/dR > 0$. However, if P_L' is positive, and q incentives are relatively weak ($f_q(q,L) \approx 0 \approx c_{rq}$ and

[6] More generally…

$U_q f_q(q,H) < P_L' U^{L*}$), then favorable editorial bias leads to a higher q but a lower r, $dq/dR > 0$ and $dr/dR<0$.

C. Equilibrium Editorial Favoritism

Solutions to equations (10)-(12) give us the optimal quality choices, q(a,R) and r(a,R). Plugging these into (9) gives the equilibrium condition for R, given z and γ:

$$(9') \quad R = V(R,z,\gamma) \equiv (1-\delta)[\gamma\, r(h,R)+(1-\gamma)\, r(l,R)] - [z/(1-\alpha)] + [\alpha Q/(1-\alpha)]\,[\gamma\, f(q(h,R),H) + (1-\gamma)\, f(q(l,R),H)]$$

To ensure stability of the equilibrium, we assume

Assumption 1. For relevant (R,z,γ), $V_R()<1$.

Lemma 3. Equation (9') defines a unique and stable equilibrium, R*(z,γ).

Proof. Existence follows from (A) $V()>-z/(1-\alpha)$ for all R, (B) $V()<\bar{V}$ for all R, where $\bar{V} > -z(1-\alpha)$ is defined in note 5, and hence, (C) by the Intermediate Value Theorem, there exists an $R \in (-z/(1-\alpha), \bar{V})$: $V()=R$. Uniqueness and stability follow from Assumption 1. QED.

Editorial favoritism is defined as a bias (R) that depends upon an author's group membership. For example, if an author is a member of the high-γ "in-network" group 1, does he/she enjoy more favorable editorial treatment than if he/she were a member of the lower-γ "out-of-network" group 0, $R^*(z,\gamma_1)>R^*(z,\gamma_0)$?

Proposition 1. (A) There is editorial favoritism in equilibrium, $dR^*(z,\gamma)/d\gamma > 0$. (B) Higher/tighter publication standards (z) reduce the extent of favorable bias for all groups, $dR^*(z,\gamma)/dz < 0$. (C) However, tighter publication standards can lead to a greater extent of editorial favoritism, $\frac{d}{dz}\left[\frac{dR^*(z,\gamma)}{d\gamma}\right] > 0$.[7]

The intuition for editorial favoritism (Proposition 1(A)) is as follows: Higher ability authors produce higher quality papers (both q and r). Because the "in-network" group is blessed with a higher fraction of high ability authors, editors (and referees) can infer that, on average, the quality of their submissions will be higher, leading to editorial bias in their favor. This editorial favoritism in turn has incentive effects, generally favoring higher q qualities and higher or lower r qualities. These incentive effects feedback in the equilibrium, leading to even more divergence between the inferred quality of "in-network" and "out-of-network" groups (at least in the case of q quality).

Note that editorial favoritism is generally associated with higher paper quality. A higher R for the favored group is associated with higher average q and r qualities due to both the higher average ability of the favored group and the incentive effects of the favoritism. Hence, the empirical observation that an author's editorial connection is associated with a higher quality of publication (LP, 1994; Medoff, 2003) is consistent with the presence of editorial favoritism.

Let us turn next to the effects of tightened standards due, for example, to increased competition for access to the H journal. Tightened standards are achieved by lowering acceptance probabilities across the board (Proposition 1(B)). However, if there

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[7] Sufficient conditions for Proposition 1(C) are: $P_L'(r)=c_{rq}(r,q,a)=0$, $f_{qq}(q,,t)<0$ and $f_{qqq}(q,t)\leq 0$, and $c_{rrr}() \overset{s}{=} c_{qqq}() \geq 0$, for relevant (r,q), $a\in\{l,h\}$ and $t\in\{L,H\}$.

are diminishing marginal effects of R on quality choices, then tightened standards increase the extent of editorial favoritism (Proposition 1(C)). With diminishing marginal effects of R, an author's marginal response to R (in lowered quality) is smaller is he/she is a high ability / high R author that produces higher quality. Hence, when R's go down, due to the tightening in z standards, there is a greater effect on authors with low ability and/or low R. Because the "out-of-network" group has more low quality authors and faces a lower R, their quality levels fall more on average; this leads in turn to a greater decline in the equilibrium R for this group – as a function of its authors' average quality choices – than for the "in-network" group. The result is an increased divergence between the equilibrium R's of the two groups.

Note that, as editorial standards (z) tighten, the editorial favor index R falls for all authors. Authors respond by lowering q-quality (provided $dq/dR>0$) and lowering (raising) r-quality as $dr/dR > (<) 0$. However, tightening standards over time need not be associated with lowered quality production, even when $dq/dR \overset{s}{=} dr/dR > 0$. Suppose that the source of change is an increase in reward to H publication (U_H). In this case, the direct effect of the higher U_H is generally to elevate incentives for (q,r) quality production. The offsetting effect is due to the resulting increased competition for H journal space, which leads to tightening z standards and an attendant lessening of (q,r) production incentives. Under some conditions, the direct effect dominates the indirect effect.

<u>Lemma 4</u>. Suppose that $f_{qq}(q,t)\approx c_{rrr}()\approx c_{qqq}()\approx c_{rq}()\approx P_L'()\approx 0$ for relevant (q,r) (and $t\in\{L,H\}$). Then, in equilibrium, a rise in U_H leads to an increase in r-quality for all authors, and provided $c_{qq}\geq c_{rr}$, an increase in q-quality, even though editorial standards tighten.

<u>D. A Note on Welfare</u>

How does editorial favoritism affect economic welfare? For simplicity, I will focus on only one aspect of welfare (arguably the most important): the average number of "high impact" papers:

$$n_Q = \sum_{i=0}^{1} N_i \sum_{a=l}^{h} \gamma_{ai} \left[P_H(r_{ai},R_i)f(q_{ai},H) + (1-P_H(r_{ai},R_i))P_L(r_{ai})f(q_{ai},L)\right] \tag{19}$$

where $\gamma_{hi}=\gamma_i$, $\gamma_{li}=(1-\gamma_i)$, $r_{ai}=r(a,R_i)$, $q_{ai}=q(a,R_i)$. The question of interest is this: Subject to H journal capacity, what choices of R_i's maximize n_Q? In particular, does editorial favoritism ($R_0<R_1$) increase or decrease the number of high impact papers?

The journal capacity constraint on the "editorial favor indexes," (R_0,R_1), is:

$$\sum_{i=0}^{1} N_i \sum_{a=l}^{h} \gamma_{ai} P_H(r_{ai},R_i) = K = \text{journal capacity} \tag{20}$$

Differentiating (20) gives:

$$dR_1/dR_0 = -\{ N_0 \sum_{a=l}^{h} \gamma_{a0} [\delta(dr(a,R_0)/dR)+1]g\}/\{ N_1 \sum_{a=l}^{h} \gamma_{a1} [\delta(dr(a,R_1)/dR)+1]g\} \tag{21}$$

Under plausible conditions (which we assume hold),

$$\delta(dr(a,R)/dR)+1 > 0. \tag{22}$$

Hence, $dR_1/dR_0<0$; if one increases editorial favor to one group, one must lower the favor to the other group in order not to exceed journal capacity.

Differentiating (20) with respect to R_0, where $R_1=R_1(R_0)$ from (21),

(23) $$dn_Q/dR_0 \overset{s}{=} Z_0 - Z_1,$$

where (substituting from (12) and rewriting) $Z_i=Z(\gamma_i,R_i)$.

(24a) $$Z(\gamma,R) - f^*(q(h,R),r(h,R)) + [A(\gamma,R)/B(\gamma,R)]$$

(24b) $$A(\gamma, R) =\{\sum_{a=l}^{h} \gamma_a(\gamma)[U_q^{-1}c_q(q(a,r),r(a,R),a)(dq(a,R)/dR)$$
$$+ (1-P_H(r(a,R),R))f(q(a,R),L)\ P_L'(r(a,R))(dr(a,R)/dR)]\}$$
$$+ (1-\gamma)g[\delta(dr(l,R)/dR)+1]\{f(q(l,R),H)-f(q(h,R),H)\},$$

(24c) $$B(\gamma, R) =\{\sum_{a=l}^{h} \gamma_a(\gamma)\ g[\delta(dr(l,R)/dR)+1],$$

where $\gamma_h(\gamma) = \gamma$ and $\gamma_l(\gamma) = (1-\gamma)$.

Proposition 2. Suppose that $f_{qq}(q,t)\approx c_{rrr}()\approx c_{qqq}()\approx c_{rq}()\approx P_L'()\approx 0$ for relevant (q,r) (and $t\in\{L,H\}$). Then editorial bias in favor of group 1 ($R_1>R_0$) increases the number of high impact papers. Formally, for $R_1\geq R_0$, $Z_1>Z_0$ and, hence, $dn_Q/dR_0<0$.

Raising R has two general types of effect on expected q production. First is a "portfolio effect." A higher R increases the probability of H publication, which increases the chance that the high impact (q) component of a paper is "discovered." Because higher-γ groups have higher q's on average (even with the same R, and even more with higher R), this effect is greater for these groups. Second are two "incentive effects," both due to the positive impact of a higher R on q production. For the first, let us hold constant (for the moment) the incentive effect of higher R on q production. Because higher ability authors have higher probabilities of H publication, benefits of given increases in q – in expected "high impact" – are greater for higher ability authors. Hence, these benefits are higher, on average, for higher-γ groups that have a higher fraction of high ability authors. However, the second incentive effect can be offsetting; the marginal effect of R on q production is (under some conditions) less for higher ability / higher R authors. When the second incentive effect is not present (as is true when $f_{qq}(q,t) \approx c_{rrr}() \approx c_{qqq}() \approx c_{rq}() \approx P_L'() \approx 0$), then incentive benefits of higher R in producing greater expected "high impact" are larger for the high-γ group, and we have a coincidence of "portfolio" and "incentive" effects. In this case, editorial favoritism produces a higher number of high impact papers.

Note, however, that this salutary role for favoritism hinges crucially on cross-group differences in ability distributions – on the statistical discrimination at the heart of the foregoing analysis. Suppose instead that there are no differences between the two groups in their abilities. And suppose that editorial favoritism takes a "naked" form of simply favoring members of one's own group. Then only the second incentive effect is present, and the logic of Proposition 2 implies that favoritism has harmful effects, leading to fewer high impact papers on average.

III. Theory 2

A. Model 2

Suppose now that there is no asymmetry in the ability distributions of the two groups, $\gamma_0=\gamma_1=\gamma$. Indeed, we can assume (without loss) that there is only one common author ability. However, let us also suppose that referees play a more active role in editorial decision-making. Specifically, a referee observes r quality (or a signal of r quality),

$$\tilde{r} = r + \varepsilon.$$

A referee from group j recommends outright rejection if

(1) $$\tilde{r} + \varepsilon < w_j + \tilde{v}$$

where w_j is the referee's assessment of the H journal standard, based on his/her group j experience (more in a moment), and $\tilde{v}$ takes one of two possible values, depending upon whether the referee is "tough" or "kind." If the referee is "tough," then $\tilde{v} = v_+ > 0$; in this case, the referee recommends rejection unless the estimated paper quality is at least v_+ above the inferred journal standard. Conversely, if the referee is "kind," then $\tilde{v} = -v_- < 0$; in this case, the referee recommends rejection only if estimated quality is at least v_- below the inferred journal standard. The proportion of tough referees in group i is η_i. For the moment, I assume that group 0 has a higher fraction of tough referees $\eta_0 > \eta_1$.

If a referee does not recommend rejection, he/she reports $\tilde{r}$ to the Editor. The Editor in turn rejects papers recommended for rejection. If rejection is not recommended, the Editor accepts the paper if and only if the estimated paper quality is above his z standard,

(2) $$\alpha F_i Q + (1-\alpha)\,\tilde{r} \geq z.$$

For an author in group i, the Editor consults a referee in group i with probability β_i, and a referee in the other group with probability $(1-\beta_i)$. For the moment, I assume that the β_i are fixed, with $\beta_i > ½$ for $i \in \{0,1\}$, so that authors in each group can expect to obtain a referee from their own group more often than one from the other group.

Given this structure, a paper is accepted if, with referee from group j of type $t \in \{$T (tough), K (kind)$\}$

(3) $$\varepsilon \geq W_{ijt} - r, \text{ where}$$

(4) $$W_{ijt} = \max\,\{ w_j + \tilde{v},\ [z - \alpha F_i Q]/(1-\alpha)\}$$

Averaging across potential referee groups j and types t gives the average author standards:

(5) $$W_0 = \beta_0\,\{\eta_0 W_{00T} + (1-\eta_0)W_{00K}\} + (1-\beta_0)\,\{\eta_1 W_{01T} + (1-\eta_1)W_{01K}\}$$

(6) $$W_1 = \beta_1\,\{\eta_1 W_{11T} + (1-\eta_1)W_{11K}\} + (1-\beta_1)\,\{\eta_0 W_{10T} + (1-\eta_0)W_{10K}\}$$

Due to the assumed uniform distribution for ε, an author's probability of acceptance is determined by his/her average standard, $P_H(r,-W_i) = g\,(\underline{\varepsilon} - W_i)$. Referees have a rational inference of a journal's standard, based on their group's experience,

(7) $$w_j = W_j$$

Note that here $(-W_i)$ is the index of editorial favoritism for an author in group i – the present analog to R from Model 1.

B. Equilibrium Editorial Favoritism

To characterize an equilibrium, recall the definition of F_i (the Editor's expected "high impact" from a group i author)

(8) $$F(W) = f(q(a,-W),H)$$

where $q(a,R=-W)$ is as before (with δ=1 and a = common author ability). Defining

(9) $$V(W) = [z - \alpha F(W)Q]/(1-\alpha)$$

and substituting (7)-(9) into (5)-(6) gives equilibrium values of (W_0,W_1):

(5') $W_0 = \beta_0 \{\eta_0 \max (W_0+v_+, V(W_0)) + (1-\eta_0) \max (W_0-v_-, V(W_0)) \}$
$+ (1-\beta_0) \{\eta_1 \max (W_1+v_+, V(W_0)) + (1-\eta_1) \max (W_1-v_-, V(W_0))\}$

(6') $W_1 = \beta_1 \{\eta_1 \max (W_1+v_+, V(W_1)) + (1-\eta_1) \max (W_1-v_-, V(W_1)) \}$
$+ (1-\beta_1) \{\eta_0 \max (W_0+v_+, V(W_1)) + (1-\eta_0) \max (W_0-v_-, V(W_1))\}$

To ensure a stable equilibrium, we again assume:

Assumption 1': $\partial V(W)/\partial W < 1$ for relevant W.

Proposition 3. In Model 2, there is equilibrium editorial favoritism – with group 1 favored over group 0, $W_0 > W_1$ – provided (i) $\beta_0+\beta_1 > 1$ (e.g., $\beta_0=\beta_1=\beta > ½$), and (ii) $\eta_0 > \eta_1$.

The intuition is straightforward. Group 0 has relatively more tough referees ($\eta_0 > \eta_1$). Group 0 is also relatively more exposed to referees from group 0 than is group 1 (with $\beta_0+\beta_1 > 1$). As a result, group 0 is more exposed to the higher editorial hurdle imposed by the tough reviewers. Note that the resulting discrimination is subject to two multipliers: First, the higher hurdle of the tough referees ($v_+>0$) raises the average hurdle (W_0), which further raises the hurdle of group 0 referees (W_0+v_+), and so on. Second, the higher average hurdle (W_0) generally reduces group 0's incentives to produce q-quality, thus elevating the Editor's $V(W_0)$ hurdle, which in turn raises the average hurdle W_0, and so on.

A number of other results can also be obtained.

Proposition 4. Lowering the proportion of papers handled by referees from the same group (β_i) reduces the extent of editorial favoritism (assuming $\beta_0+\beta_1 > 1$):

$$d(W_0-W_1)/d\beta_i > 0.$$

Lowering β_0 exposes group 0 to a lower fraction of tough referees, while lowering β_1 exposes group 1 to a higher faction of the tough referees. Both changes thereby reduce the difference between the groups in their exposure to the tough reviewers, which in turn reduces the difference between the two groups' equilibrium editorial hurdles.

Proposition 5. Assume diminishing marginal effects of R on quality choices,

$$\frac{d}{dR}\left[\frac{dq(a,R)}{dR}\right] < 0$$

(e.g., conditions of Proposition 1(C)). Then: Editorial favoritism leads to a lower average number of high impact papers. That is, setting $\beta_0=\beta_1= ½$ (vs. $\beta_0+\beta_1 > 1$) will lead to a higher number of high impact papers.

Here, there are no cross-group ability differences. Hence, the only effect of editorial favoritism on the provision of q-quality is the pure incentive effect. In essence, one wants to "allocate" R (-W) so as to maximize average incentives for q production. With diminishing marginal effects of R on q incentives, incentives are maximized by equal "allocations," $R_0=R_1$ (implying $W_0=W_1$).

Proposition 6. Suppose

$$\frac{d}{dR}\left[\frac{dq(a,R)}{dR}\right] \leq 0$$

Then: Tighter publication standards (z) lead to a greater extent of editorial favoritism,

$$d[W_0-W_1]/dz > 0.$$

As publication standards (z) rise, the Editor's standard rises in tandem. For both groups, the rise depletes q incentives, thus raising the Editor's net standard (V(W)) further. However, the depletion in q incentives is smaller for the low W (high R / high q) group 1 due to (i) diminishing marginal effects of R on q-quality (the assumption underpinning Proposition 6), and (ii) diminishing marginal effects of q-quality on the likelihood of high impact ($f_{qq}\leq 0$). As a result, the net Editor standard rises less for the low W (high R) group 1 than for group 0, thereby increasing the extent of editorial favoritism.

C. Endogenous Reviewer Assignments (β_0,β_1)

I have so far assumed that the Editor's policy of assigning reviewers – the fraction of the time that an author is assigned a referee from his/her own group – is fixed. Now let us allow the Editor to choose these fractions optimally.

Let χ denote the maximum number of papers that can be assigned to any one referee (per period, on average). I will assume that this number is no lower than one, but is also bounded above:

Assumption 2. $1 \leq \chi < 1+(N_0/N_1)$.

For example, if the "out-of-network" group 0 is larger ($N_0>N_1$) and each referee can be assigned no more than two reviews per period (χ=2), then Assumption 2 will hold.

In choosing the fractions, (β_0,β_1), the Editor is subject to two types of constraints. First, χ places an upper bound on the number of papers that can be sent to each group of reviewers:

(A) Number of papers refereed by group 0 = $N_0\beta_0+N_1(1-\beta_1)$
$\leq \chi N_0$ = maximum number of group 0 reviews

(B) Number of papers refereed by group 1 = $N_1\beta_1+N_0(1-\beta_0)$
$\leq \chi N_1$ = maximum number of group 1 reviews

Constraints (A) and (B) place upper and lower bounds (respectively) on β_0:

(10) $\beta_0 \leq \chi + (N_1/N_0)(\beta_1-1)$ and $\beta_0 \geq 1 + (N_1/N_0)(\beta_1-\chi)$

Second, of course, both fractions must lie in the unit interval,

(C) $0 \leq \beta_0 \leq 1$, and $0 \leq \beta_1 \leq 1$.

Figure 1 graphs the constraints. Two observations are relevant to the graph. When β_1=1, Assumption 2 implies that the lower bound for β_0 (from constraint (B)) is positive and no greater than one. Moreover, when χ is greater than one, the upper bound for β_0 (from constraint (A)) is above the lower bound (from constraint (B)); when χ equals one, the two constraint lines are identical and reduce to one equality restriction.

Subject to these constraints and a binding quota on the average number of papers that can be published (the Journal space constraint), the Editor's objective is to maximize the average (weighted) quality of published papers. The space constraint yields the shadow value (publication standard) z. I will assume that the Editor takes as given the equilibrium values, (W_0, W_1), and the referee attributes (which will also be equilibrium outcomes in a moment), (η_0,η_1). Because there are multiple Editors, and any one Editor has a relatively short editorial tenure, an individual Editor cannot affect these equilibrium outcomes.

Without loss, I assume that group 0 is the disadvantaged group, $W_0\geq W_1$ with $\eta_0\geq\eta_1$ (where the two inequalities will be related in a moment). Finally, for simplicity, I assume:

Assumption 3. v_- is sufficiently large that (in an equilibrium (5')-(6')),

$$W_i-v_- < V(W_i)$$

The Editor's choice problem is then as follows:

(11) $$\max_{(\beta 0,\beta 1)} J^{**} = N_0\, J^{0*} + N_1\, J^{1*} \quad \text{s.t} \quad (\beta_0,\beta_1) \in B$$

where, with

$$J_i(X) = g \int_{X\text{-}ri}^{\infty} \{(1\text{-}\alpha)(r_i+\varepsilon) + \alpha Q f(q_i;H) - z\}\, d\varepsilon = g \int_{X\text{-}ri}^{\infty} (1\text{-}\alpha)(r_i+\varepsilon - V(W_i))\, d\varepsilon$$

= average net quality of author i paper accepted for publication when $\varepsilon > X\text{-}r_i$

J^{0*} = average accepted paper quality from group 0 author (net of z)

$$= \beta_0\eta_0\, J_0(W_0+v_+) + [\beta_0(1\text{-}\eta_0)+(1\text{-}\beta_0)(1\text{-}\eta_1)]\, J_0(V(W_0)) + (1\text{-}\beta_0)\eta_1\, J_0(\max(W_1+v_+,V(W_0))),$$

J^{1*} = average accepted paper quality from group 1 author (net of z)

$$= \beta_1\eta_1\, J_1(W_1+v_+) + \beta_1(1\text{-}\eta_1)\, J_1(V(W_1)) + (1\text{-}\beta_1)\eta_0\, J_1(W_0+v_+) + (1\text{-}\beta_1)(1\text{-}\eta_0) J_1(\max(W_0\text{-}v_-,V(W_1))),$$

The following inequalities are easily established, and imply the optimum depicted in Figure 1: (a) $dJ^{**}/d\,\beta_0 = N_0\, dJ^{0*}/d\,\beta_0 < 0$ (=0 if $W_0\text{-}W_1=\eta_0\text{-}\eta_1=0$); (b) $dJ^{**}/d\,\beta_1 = N_1\, dJ^{1*}/d\,\beta_1 > 0$ (=0 if $W_0\text{-}W_1=\eta_0\text{-}\eta_1=0$); and (c) $dJ^{**}(\beta_0(\beta_1), \beta_1)/d\,\beta_1 > 0$, where $\beta_0(\beta_1)$ solves (B) with equality,

$$\beta_0(\beta_1) = 1+(N_1/N_0)(\beta_1\text{-}\chi).$$

Proposition 7. $\beta_{1*}=1$, $\beta_{0*} = \beta_0(1) = 1 + (N_1/N_0)(1\text{-}\chi) \in (0,1]$. The favored group 1 is treated more favorably in the Editor's optimal allocation of reviewers.

Intuitively, tough reviewers recommend rejection more often than the Editor would himself (herself) reject, given his/her efficient standard. Therefore, ceteris paribus, one would like to minimize authors' exposure to the tough reviewers. Because group 1 has fewer tough referees, this criterion favors a lower β_0 and a higher β_1, subjecting authors of both groups to more group 1 referees. Group 1 referees are therefore scarce; that is, constraint (B) binds. Moreover, allocating group 1 reviewers between groups 0 and 1 authors (along constraint (B)), the Editor favors group 1 authors because the extent of over-rejection by group 0 reviewers is greater for group 1 authors who produce higher quality papers, than for group 0 authors. In particular, consider the difference between the inflated standard of the tough group 0 reviewers, W_0+v_+, and the Editor's (efficient) standard for a group i author, $V(W_i)$. Because the Editor infers a higher q-quality from group 1, the Editor's hurdle (for r) is lower for group 1, $V(W_1)<V(W_0)$. Hence, for group 1 (vs. group 0) authors, there is a higher cost of excessive rejection by the tougher group 0 reviewers. The Editor avoids this higher cost of excessive rejection by allocating the kinder group 1 referees first to group 1 itself. Note that if χ equals one (so that each author can only referee once per period, on average), then this rule reduces to setting $\beta_0=\beta_1=1$; that is, each group of authors is allocated referees exclusively from their own group.

D. Endogenous Referee Propensities to be Tough (η_0,η_1)

I have so far assumed that the referee propensities to be tough, (η_0, η_1), are exogenous. Let us now suppose that the author groups are *completely identical apriori* (save perhaps their constituent numbers), and allow these propensities to be equilibrium outcomes. The key question for this analysis is: Can an asymmetric equilibrium arise in which one group is "tougher" than the other, and is treated less favorably in the editorial process ($W_0>W_1$)?

Let us assume that the propensity to be tough is related to the rejection rate experienced by authors in each group:

(12) $$\eta_i = \eta(W_i),$$

where $\eta(W) = \underline{\eta} \geq 0$ for $W \leq \underline{W}$, $\eta'(W) > 0$ for $W > \underline{W}$, and $\eta(W) < 1$ for all W.

Again without loss, I index the groups so that group 0 is weakly disadvantaged ($W_0 \geq W_1$, and $\eta_0 \geq \eta_1$), implying (from Section C above) an Editor choice of $\beta_1 = 1$ and $\beta_0 = 1 + (N_1/N_0)(\beta_1 - \chi) \in (0,1]$.[8] An equilibrium value for W_1 thus solves:

(13) $$W_1 = \eta_1 (W_1 + v_+) + (1-\eta_1) V(W_1), \;\; \eta_1 = \eta(W_1).$$

Lemma 5. There is at least one stable solution to (13). Define W* as the minimum stable solution.

Likewise, an equilibrium for W_0 solves:

(14) $$W_0 = \beta_0 \eta_0 (W_0 + v_+) + \gamma_0 V(W_0) + (1-\beta_0)\eta_1 \max(W^* + v_+, V(W_0))),$$

where $\eta_0 = \eta(W_0)$, $\eta_1 = \eta(W^*)$, and $\beta_0 = \beta_0(1)$. The following is immediate:

Lemma 6.: There is a symmetric equilibrium (solution to (13)-(14)):

$$W_0 = W_1 = W^* = V(W^*) + (\eta(W^*)/(1 - \eta(W^*))v_+.$$

However, in some cases, there can also be an asymmetric equilibrium – the interesting cases for this paper. To see this, note that by Assumption 1, one can define the solution to (13) for given η_1.

(13') $$W_1 = W_1(\eta_1)$$

and to (14) for given η_0, η_1, and W_1:

(14') $$W_0 = W_0(\eta_0, \eta_1, W_1)$$

Observe that $dW_i/d\eta_i > 0$; a higher fraction of tough reviewers raises the average group i editorial hurdle. In addition, for common (W, η), we have $dW_1/d\eta_1 \geq dW_0/d\eta_0 > 0$; because $\beta_1 = 1$ (and $\beta_0 \leq 1$), increasing the own-group proportion of tough reviewers has a more adverse effect on group 1 than on group 0. These observations imply three cases (corresponding to three pictures): (i) when $W^* > \underline{W}$; (ii) when $W^* = W_1(\underline{\eta}) < \underline{W}$ and $\eta(W) < W_0^{-1}(\eta_0, \underline{\eta}, W^*)$ for all $W > \underline{W}$; and (iii) when $W^* = W_1(\underline{\eta}) < \underline{W}$ and $\eta(W) > W_0^{-1}(\eta_0, \underline{\eta}, W^*)$ for some $W > \underline{W}$. In the first two cases, there is the stable symmetric equilibrium of Lemma 6. However, in the third case, depicted in Figure 2, we have two locally stable symmetric equilibria, and one asymmetric equilibrium. The possible stable equilibrium points are $(W^*, \underline{\eta})$ and $(W_{0*} > W^*, \eta_{0*} > \underline{\eta})$, as depicted in Figure 2. Assigning the first equilibrium point to group 1 and the second to group 0 gives a locally stable asymmetric equilibrium.

Proposition 8. An asymmetric equilibrium can prevail in which there is editorial favoritism, $W_0 > W_1$.

Underpinning Proposition 8 is the following logic. Group 0 authors can have pessimistic beliefs about their editorial treatment (W_0) that are consistent in the sense that they produce a propensity for tough reviewing in group 0 – and attendant steering of group 0 papers to the tougher group 0 referees, by optimizing Editors – that in turn yield the expected editorial treatment (W_0) in equilibrium. For the same reasons, group 1 can have optimistic beliefs (W_1) that are "consistent."[9]

Lemma 7. The asymmetric case of Figure 2 is more likely – and editorial discrimination (W_0-W_1) is greater – when (assuming $\underline{W}$-W*>0): (i) $\underline{W}$-W* is smaller, (ii)

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[8] For $W_0 = W_1$, the Editor is indifferent with respect to choices of (β_0, β_1); hence, (β_0, β_1) can be set according to Proposition 7 without loss.

[9] See Coate and Loury (1993) for a labor market model of employment discrimination in which there can be an asymmetric equilibrium despite no explicit differences between groups.

$\eta'(W)$ is larger, so that the propensity to be tough is very sensitive to unfavorable editorial treatment; (iii) β_0 is larger, as is true when χ is closer to 1 and (N_1/N_0) is smaller; (iv) v_+ is larger; and (v) provided the following two conditions hold, editorial standards (z) / space constraints are tighter: (a) $\underline{\eta} \approx 0$ and/or $\beta_0 \approx 1$, and (b) $d^2q/dR^2 \leq 0$.[10]

Graphically, condition (ii) implies that $\eta(W)$ is steeper, while (iii)-(iv) imply that $W_0()$ is more sensitive to η_0 and hence, "flatter." Tightened standards raise editorial hurdles for both groups, but due to the same logic as underpins Proposition 6 above, raises the hurdle less for the advantaged group 1.

E. Endogenous Editorial Decision-Making

So far I have assumed that the Editor accepts negative referee recommendations and evaluates positive referee recommendations. That is, a paper recommended for rejection is simply rejected, whereas a paper not recommended for rejection is evaluated by the Editor and accepted if (and only if) the assessed quality is above the Editor's requisite benchmark (z). However, the Editor can, in principle, decide if and when to "evaluate" a paper, based upon the information he/she has about the author's group, the referee's group, and the recommendation of the referee.

To allow for this editorial choice, let e denote the Editor's cost of "evaluating" one paper, rather than simply accepting the referee's negative or positive recommendation. Without evaluation, the Editor will reject a paper recommended for rejection and accept the paper if it is recommended for acceptance. Further, let λ_{nij} denote the fraction of *negative* (reject) recommendations that the Editor evaluates when the author is from group i and the referee from group j. Likewise, let λ_{pij} denote the corresponding fraction of *positive* recommendations that the Editor evaluates. So far I have implicitly assumed that, for all (i,j), $\lambda_{nij} = 0$ and $\lambda_{pij} = 1$.

In making his/her evaluation decision, the Editor compares (i) the expected net gains from evaluation in increasing the expected quality of accepted papers, to (ii) the cost of evaluation e.

Consider first the case of *negative* referee recommendations. Here there are gains from evaluation whenever the paper would otherwise be *over-rejected* – that is, when the referee rejects, even though the Editor would not. Formally, the gain from evaluation is:

$$\text{gain} = \max(0, \alpha F_i Q + (1-\alpha)\tilde{r} - z) = \max(0, (1-\alpha)(r_i + \varepsilon - V(W_i)))$$

To evaluate the *expected* gain, the Editor can use the information about ε that is provided by the negative referee recommendation, namely the condition,

$$\text{(N)} \qquad \varepsilon < W_j + \tilde{v} - r_i$$

where

$$\text{Probability of (N)} = \begin{cases} G(W_j+v_+-r_i) & \text{for } t=T \\ G(W_j-v_--r_i) & \text{for } t=K \end{cases}$$

The conditional expected gain from evaluation is thus:

[10] Formally, condition (vi) follows from:

$$d(W_0-W_1)/dz \overset{s}{=} -\underline{\eta}(1-\beta_0)(1-\delta\eta_0) + \gamma_0(V'(W_0)-V'(W_1)),$$

where $\gamma_0 = \beta_0(1-\eta_0)+(1-\beta_0)(1-\eta_1) + \delta(1-\beta_0)\eta_1$, and $\delta=1$ if $W_1+v_+<V(W_0)$, 0 otherwise. Hence, given conditions (a)-(b), we have $d(W_0-W_1)/dz > 0$.

$$(15)\quad I_{nij} = (1-\alpha)\ \{\ \eta_j \int_{V(Wi)-ri}^{\max(Wj+(v+)-ri,V(Wi)-ri)} (\varepsilon - V(W_i)+r_i)(g/\ G(W_j+v_+-r_i))\ d\varepsilon$$

$$+(1-\eta_j) \int_{V(Wi)-ri}^{\max(Wj-(v-)-ri,V(Wi)-ri)} (\varepsilon - V(W_i)+r_i)(g/\ G(W_j-v_--r_i))\ d\varepsilon\ \}$$

Proposition 9. $I_{n10} > \max(I_{n00}, I_{n11}) > I_{n01}$. Incentives to reevaluate *negative* referee recommendations are

(i) highest when the author is from the advantaged group 1 and the referee is from the disadvantaged group 0, and

(ii) lowest when the author is from group 0 and the referee from group 1.

The problem of over-rejection is greater when (i) the referee sets an editorial hurdle (W_j) that is too high for the author ($W_j > W_i \geq V(W_i)$), as is true when there is an "out-of-network" referee for an in-network author, and (ii) the referee is more likely to be tough (with higher group η). Hence, the problem is greatest when the referee is from the "tougher" group 0 and the author is from the "kinder" group 1. Conversely, the problem is at a minimum when the referee is from group 1 and the author from group 0.

Consider next the case of ***positive*** referee recommendations. Here there are gains from evaluation whenever the paper would otherwise be *over-accepted* – that is, when the referee accepts, even though the Editor would not – implying the following gain:

$$\text{gain} = \max(0, z - \alpha F_i Q - (1-\alpha)\ \tilde{r}\ ) = \max(0, (1-\alpha)(V(W_i) - r_i - \varepsilon))$$

To evaluate the *expected* gain, the Editor can again use the information about ε that is provided by the referee recommendation, namely the condition,

$$\text{(P)}\qquad \varepsilon \geq W_j + \tilde{v} - r_i$$

where

$$\text{Probability of (P)} = \begin{cases} 1 - G(W_j+v_+-r_i) \text{ for } t=T \\ 1 - G(W_j-v_--r_i) \text{ for } t=K \end{cases}$$

The conditional expected gain from evaluation is thus:

$$(16)\quad I_{pij} = (1-\alpha)\ \{\ \eta_j \int_{\min(Wj+(v+)-ri,V(Wi)-ri)}^{V(Wi)-ri} (\ V(W_i) - r_i - \varepsilon)[g/\ (1-G(W_j+v_+-r_i))]\ d\varepsilon$$

$$+\ (1-\eta_j) \int_{\min(Wj-(v-)-ri,V(Wi)-ri)}^{V(Wi)-ri} (V(W_i) - r_i - \varepsilon)[g/(1-G(W_j-v_--r_i))]\ d\varepsilon\ \}$$

Proposition 10. $I_{p01} > \max(I_{p00}, I_{p11}) > I_{p10}$. Incentives to reevaluate *positive* referee recommendations are

(i) highest when the author is from the disadvantaged group 0 and the referee is from the advantaged group 1, and

(ii) lowest when the author is from group 1 and the referee from group 0.

The problem of over-acceptance is greater, the greater the extent to which the referee is kind, and the lower the editorial hurdle of the kind referee. For example, a kind referee from the "kinder" group 1 (vs. the tougher group 0) sets a lower editorial hurdle ($W_1 < W_0$), implying a greater extent of over-acceptance for group 0 authors. Because group 1 also has more kind referees, the problem of over-acceptance is greatest with the group 1 referees and group 0 authors. Conversely, the problem is least when the referee is from the tougher group 0 and the author is from the advantaged group 1.

Together, Propositions 9 and 10 suggest another margin on which optimizing Editors may advantage the "in-network" group 1. However, particularly given the results in Section C above, it remains to compare the Editor's evaluation gains for referee reports from an author's own group.

Can our prior equilibrium results extend to this setting, with endogenous editorial "evaluations" of referee recommendations? My preliminary answer is "yes":

<u>Proposition 11</u>. Suppose that (i) $\chi = 1$, and (ii) *if* $\beta_0 = \beta_1 = 1 - \lambda_{nij} = \lambda_{pij} = 1$ (for $i \in \{0,1\}$, $j \in \{0,1\}$), *then* there is an asymmetric equilibrium per Proposition 8 wherein $I_{p10} \geq e > I_{n10}$. Then the latter asymmetric equilibrium is an equilibrium in the "full" model with endogenous Editor evaluation and referee allocation decisions. That is, $\beta_{0*} = \beta_{1*} = (1-\lambda_{nij}) = \lambda_{pij} = 1$ are equilibrium decision rules.

<u>IV. Extensions</u>

• Author ability in Model 2.
• Heterogeneous referee ability.
• Referee propensity to be tough depends upon author group affiliation.
• r affects high impact (as well as q).
• Human capital investments (that determine ability).
• Endogenous group / club formation (Sobel, 2000, 2001).
• Implications for editorial "affirmative action" / reverse discrimination (Wickelgren, 2002; De Fraja, 2005)

<u>V. Conclusion</u>

In this paper, I develop two models of editorial favoritism. In the first, the editorial process endogenously discriminates between two groups due to inter-group differences in the distribution of author abilities; that is, statistical discrimination arises in equilibrium. In the second, favoritism is not the result of any differences in ability and, hence, is not a form of statistical discrimination. Rather, favoritism arises due to the tendency of different groups' reviewers to be "tougher" or "kinder." The two models produce some similar predictions, and some sharp contrasts. Both yield equilibrium favoritism with quality-maximizing Editors, and both suggest that the extent of discrimination is likely to rise as editorial standards tighten due to increased competition for space in elite journals. However, "statistical favoritism" may be socially advantageous in the sense that it can lead ultimately to a higher number of path-breaking papers. In contrast, equilibrium favoritism in the second ("non-statistical") model is generally disadvantageous, producing fewer path-breaking papers than would arise if referees were allocated so as to eliminate one group's advantage – that is, allocated differently than optimizing Editors would choose.

Both models predict that favorable editorial treatment is correlated with author production of quality. The second model, in addition, predicts that a symptom of favoritism is an allocation of "advantaged group" papers to "advantaged group" referees. The first observation suggests that extant empirical work on favoritism, documenting a positive link between an author's editorial ties and his/her paper's subsequent citations, does not refute the favoritism hypothesis. Hence, this paper suggests that a more direct test of favoritism is called for. In addition, the second observation suggests an indirect test of favoritism, by examining the editorial practices of elite journals.

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Table 1
Acceptance Rates at Top Three American Journals By Institution

	Percent of Pages		
	1970-79	1980-89	2000-03
AER			
Top 4 institutions	13.1	17.0	19.0
Top 8 institutions	23.7	27.9	31.6
JPE			
Top 4 institutions	22.8	18.6	26.4
Top 8 institutions	32.8	31.1	39.7
Chicago	11.2	7.0	13.9
QJE			
Top 4 institutions	23.1	19.4	43.1
Top 8 institutions	34.1	29.8	57.5
Harvard/MIT	15.6	10.9	28.1

(Source: Siegfried, 1994; Wu, 2004.)

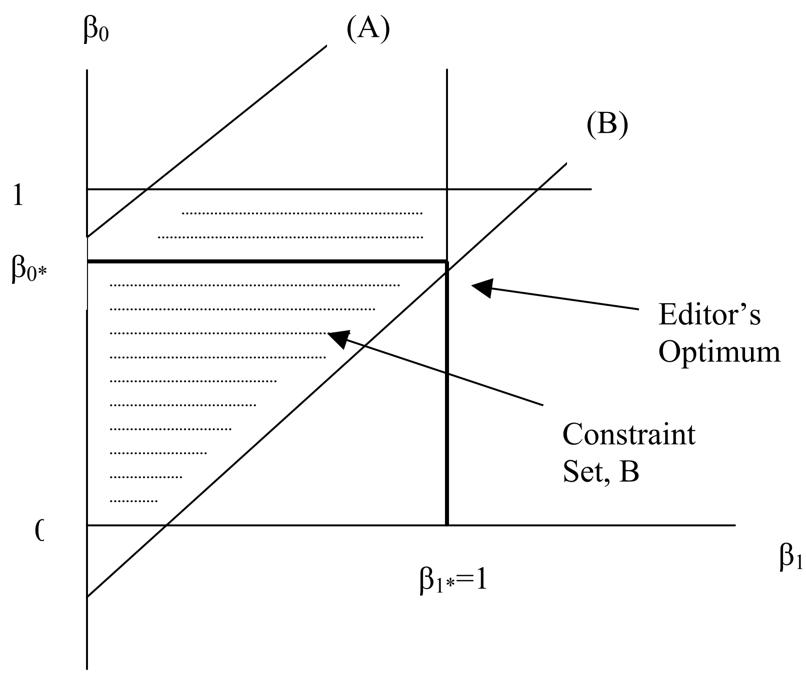

Figure 1. Endogenous Referee Assignments

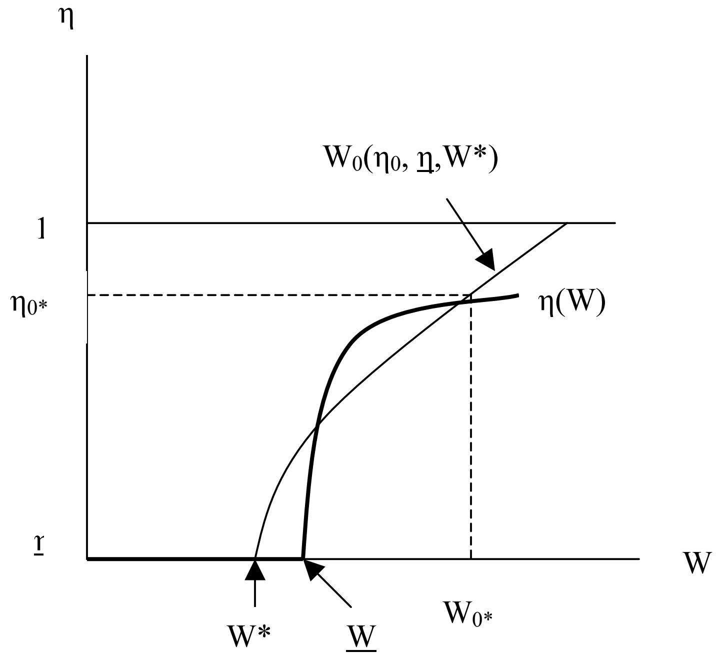

Figure 2. Locally Stable Asymmetric Equilibrium.
W_{1*}=W*, η_{1*}= $\underline{\eta}$, W_{0*}>W*, η_{0*}>$\underline{\eta}$.