

THE GAME ACADEMICS PLAY: EDITORS VERSUS AUTHORS

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ABSTRACT

This article studies a game between authors and editors. Editors play as leaders while authors are the followers. Authors maximize the number of publications seeking to increase the impact of their work in the literature, captured by citations. Editors maximize the quality of papers they publish in order to increase the reputation of their journals. The main results are: (i) rules aimed at increasing scholars productivity, such as requirements to obtain tenure, increase author's citations and journal's quality; (ii) editors willingness to build journal's reputation hurt journal's quality and increase author's publications; (iii) journal's reputation increases citations and journal's quality.

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I. INTRODUCTION

In the modern competitive academic world, publications in peer reviewed journals is an essential condition for professional success. Hiring, tenure¹ and promotion decisions are mainly based on this

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¹See McPherson and Schapiro (1999) for a recent discussion on tenure issues.

criterion (see, among others, Hamermesh *et al.*, 1982; Diamond, 1986; Hargens and Schuman, 1990; Zivney and Bertin, 1992; Formby *et al.*, 1993). The professional success is summarized by the dictum: publish or perish (Boyes *et al.*, 1984).²

In a competitive academic environment, where the number and the impact of publications give the measure of success, scholars pay attention to two main indicators: first, the quantity and the quality of their published research³ and, second, the number of citations of their work which gives the best proxy to assess research quality. For authors to have their work cited, it inevitably requires a lot of effort.⁴ Beyond the time allocated in research, scholars have to spend time searching for the best opportunity of publication such as finding a journal of good reputation that is more likely to accept their work. They have to build a network to spread their manuscripts, such as presenting their papers at international conferences and in prestigious departments (Hinshaw and John, 1995). The academic network facilitates the circulation of ideas, and personal contacts, which are essential to foster the number of publications (Faria, 2002a). Personal contact with editors and prospective referees decrease the costs of publications. They decrease the waiting time of journal's reports⁵ and the virulence against new ideas and concepts, minimizing the rejection of their papers.⁶

Authors know that in order to achieve success in terms of quantity and quality, they have to publish their papers in reputable journals with wide audience. One paper published in these journals carries the journal reputation with it. When the journal has great audience, the probability of the paper to be read and to have an impact on the literature is higher. So, this sort of publication increases the chances of getting the papers cited. Moreover, publications in these journals give a strong signal of the quality of authors' own human capital. Therefore, authors seek to maximize the number of publications in journals with a high reputation.

²Some non-academic institutions also evaluate their employees through publications, such as the research departments of the Federal Reserve System in the U.S., see Jansen (1991).

³Clearly, there can be a tradeoff between quality and quantity, see Faria (2003).

⁴See Johnson (1997).

⁵In Economics literature, the publication lags are quite severe (Yohe, 1980), which gives an idea of the waiting time between submission and journal's referee reports.

⁶Because of the personal contact, some editors have been charged with practising favouritism, publishing papers with low quality from their colleagues and former graduate students (see Laband and Piette, 1994a). Medoff (2003) found that journal editors, in order to reduce search costs involved in identifying high-quality papers, use personal ties and institutional connections to persuade high-quality authors to submit their papers to them.

By trying to publish their research, authors have to take into account the role played by the journals and their editors. As the reward for publication is high enough to motivate authors to submit their papers to journals, it creates competition for publication. In a pure competitive environment, given that every author attempts to maximize the number of publications, the space for their work in the journals diminishes. That is, the greater the journal reputation, the higher the number of submissions and the stronger the competition to publish in it. Therefore, the reward is greater for getting a paper accepted in this type of journals. It is easy to see that editors of journals with strong reputations enjoy an enormous amount of power in their hands.

As the pressure to publish increases and, consequently, the demand for space for publication, it creates a market for new journals. The creation of new journals increases the competition among them. However, the editors of these new journals have to find a niche to establish themselves. They have to build the reputation of their journals in order to attract the attention of the academic world. As a consequence, editors attempt to maximize the quality of their journals. They put forward strategies to attract new submissions, authors, and to select papers, in order to publish high-quality papers.

One of the most common ways to build journal's reputation is by pushing up the requirements to get an acceptance from the journal, such as increasing the number of referees per paper, introducing double-blind refereeing⁷ by demanding more technicalities, etc. This implies high costs of production to prospective authors (Robison and Colyer, 1994). However, the editors have to be aware of the shortcomings of these tactics, since authors pay attention to these costs and choose among the journals with the same costs, the ones with higher reputation.

As seen above, on the one hand, editors pursue the maximization of the quality of the papers they publish, taking into account the way their journal's reputation evolves.⁸ On the other hand, authors try to maximize the number of publications constrained by the way their work is cited in the literature. As authors need to publish their research in journals to get them cited, and editors need good papers to publish in order to push up the reputation of their journals, we have a game between authors and editors.

This article studies the dynamics of the game played by authors and editors. Basically, editors enjoy some degree of market power and they

⁷Incidentally, Siegfried (1994) argues that one of the possible explanations to the sharp decline after 1970 of papers published in the leading journals (AER, JPE and QJE) by the members of the top departments is due to the use of double-blind refereeing.

⁸Perlman (1991) analyses the success of some leading journals and concludes that it lies in the publication of a few provocative articles and ensuring discussions.

play the game as leaders, while authors are the followers. The model determines the optimal solutions for the number of publications, citations and journal's quality and studies the impact of journal's reputation, scholar's opportunity costs, and the rate of time preference of authors and editors on these solutions.

The article is organized as follows. The next section outlines the structure of the model. Section III presents the comparative statics analysis. The concluding remarks appear in section IV.

II. THE MODEL

There are two players in the game, one representing editors and another representing authors. The representative author (or scholar) strategy is to maximize the number of papers published (q) constrained by the way his/her work becomes known and cited (c) in the literature. The author's problem is the following:

$$\max_q \int_0^{\infty} U(q, c) e^{-\rho t} dt$$

$$\text{s.t. } \dot{c} = g(Q, R, q, c)$$

where ρ is the author's rate of time preference and U the utility function. The author can control the number of papers published (by submitting more or less articles for publication), but he/she cannot control the way his/her work is cited in the literature. As a result, the control variable of the author is the quantity of papers and the state variable is the number of citations. The citation of the author's work (c) varies positively according to the quality of his/her papers (Q), the reputation (R) of the journals where they appear and the number of papers he/she has already published (q). Thus, the evolution of the scholar's citations can be expressed as:

$$\dot{c} = \alpha Q + \beta q R - c \quad (1)$$

where α and β are positive constants. Equation (1) says that papers with high quality increase the chances of citations. In the same vein, the term qR captures the idea that, with other things being constant, the greater the number of papers published by an author in journals with high reputation, the greater the number of future citations.

As the editor is the leader and the author is the follower, we have a Stackelberg game. This is appropriate to describe an environment where

journals differ in reputation,⁹ and the leading journals enjoy greater market power.¹⁰ That is, the authors are bounded by the way editors shape the research programme. This point relates closely to Kuhn's (1970) influential *The Structure of Scientific Revolutions* in which he studied how editors set the research agenda, choosing the problems to be tackled, selecting theories and analytical frameworks and establishing empirical methods.¹¹ This creates a sort of orthodoxy. Authors who do not conform to the established criteria are less likely to have their papers accepted for publication in the leading journals.

It is important to stress that this analysis does not apply to the rare case of leading economists, who enjoy some market power and can place their papers in top journals based on their reputation and academic connections. Of course, the fact of being a leading economist does not necessarily guarantee that all his/her papers will be published in top journals as shown by Gans and Shepherd (1994) in an article that examines the case of classical papers written by leading economists rejected for publication. Even so, we can still find economists, such as Robert Solow, who has never had a paper rejected by a journal.

One can also argue that the analysis above does not reflect the case of authors associated with top-ranking departments. This might happen because the best departments put the emphasis exclusively on the quality aspect of a publication so that author's objective function would be maximized with respect to the quality Q of the papers (Faria, 2003). Although this is true, the underlying idea of this paper is that the final objective of authors is not to achieve prominence in the profession through the number of papers published, or through the reputation of the journals where their work appear, the ultimate objective of authors is to be cited in the literature, and here the author's instrument of choice and control is assumed to be the quantity of papers published rather than their quality.

The critical point about a Stackelberg equilibrium is that the leader, the editor, takes the author's constraint and reaction functions as given. In order to find the author's reaction function, we need to solve his/her problem. That is, the author plays first. In this sense, let us assume the utility function as described by the following expression: $U(q,c) = a \log c - (b/2)q^2$, where b is the opportunity cost of publications in terms of leisure foregone. The Hamiltonian corresponding to the author's problem is

⁹In fact, there are general and field journals, and for each specific niche there is almost no competition among journals, so it is safe to say that journals enjoy some market power.

¹⁰Hodgson and Rothman (1999) produce evidence of journal editors concentration in a few number of US universities.

¹¹Keynes, while editor of the *Economic Journal*, illustrates the role of an editor with a high degree of discretion and power to select papers according to his own personal views (see Moogridge, 1992).

$$H = a \log c - \frac{b}{2} q^2 + \mu(\alpha Q + \beta q R - c)$$

where the co-state variable μ is the shadow price of citations in the scholar's problem. The first order conditions are

$$H_q = 0 \Rightarrow q = \frac{\beta R}{b} \mu \quad (2)$$

$$\dot{\mu} - \rho \mu = -H_c \Rightarrow \dot{\mu} = \mu(\rho + 1) - \frac{a}{c} \quad (3)$$

By deriving equation (2) in relation to time and substituting it into equation (3) yields the scholar's reaction function

$$\dot{q} = q(\rho + 1) - \frac{a\beta R}{bc} \quad (4)$$

The representative editor strategy is to maximize the quality (Q) of the papers published in a journal, taking into consideration the author's behaviour (given by equations (1) and (4)), the actual journal reputation (R) and how the journal reputation evolves over time (\dot{R}). The editor's objective functional takes the form: $\int_0^\infty v(t, R, \dot{R}) dt = \int_0^\infty \hat{R} e^{-\delta t} dt$, where δ is the editor's rate of time preference that captures his/her willingness to acquire reputation and \hat{R} is the rate of growth of journal's reputation, which we assume to be of the following form: $\hat{R} \equiv (\dot{R}/R) = QR - (x/2)Q^2$, where x is a positive parameter.

Therefore, the editor's problem is the following

$$\max_Q \int_0^\infty \left(QR - \frac{x}{2} Q^2 \right) e^{-\delta t} dt$$

$$\text{s.t. } \dot{c} = \alpha Q + \beta q R - c$$

$$\dot{q} = q(\rho + 1) - \frac{a\beta R}{bc}$$

Notice that the editor controls the quality of the papers accepted for publication, but takes as given how the academic environment considers his/her journal in terms of reputation.¹²

The Hamiltonian of the editor's problem is

$$J = QR - \frac{x}{2}Q^2 + \lambda(\alpha Q + \beta qR - c) + \psi \left[q(\rho + 1) - \frac{\alpha\beta R}{bc} \right]$$

where λ and ψ are the co-state variables for author's citations and publications, respectively. The first order conditions are

$$J_Q = 0 \Rightarrow Q = x^{-1}(R + \lambda\alpha) \quad (5)$$

$$\dot{\lambda} - \delta\lambda = -J_c \Rightarrow \dot{\lambda} = \lambda(\delta + 1) - \psi \frac{a\beta R}{bc^2} \quad (6)$$

$$\dot{\psi} - \delta\psi = -J_q \Rightarrow \dot{\psi} = \psi(\delta - \rho - 1) - \lambda\beta R \quad (7)$$

By taking into account equation (5) and by making $\dot{c} = \dot{q} = \dot{\psi} = \dot{\lambda} = 0$ in equations (1), (4), (6) and (7), one can find the steady-state equilibrium of the model. The optimal equilibrium values of citations (c^*), number of papers published (q^*) and journal's quality (Q^*) are

$$c^* = \left[\frac{a}{b(\delta + 1)(\delta - \rho - 1)} \right]^{1/2} \beta R \quad (8)$$

$$q^* = \left[\frac{a(\delta + 1)(\delta - \rho - 1)}{b} \right]^{1/2} \frac{1}{(\rho + 1)} \quad (9)$$

$$Q^* = \left\{ \left[\frac{a}{b(\delta + 1)(\delta - \rho - 1)} \right]^{1/2} - [(\delta + 1)(\delta - \rho - 1)]^{1/2} \right\} \frac{\beta R}{\alpha} \left(\frac{a}{b} \right)^{1/2} \quad (10)$$

¹²It is worth mentioning that this model stresses the importance of individual editors. This happens because of the growing relative importance of field journals, driven by the performance of a few leading economists, indicates that the role of individuals is becoming more important than the role of departments and their respective journals (see Hodgson and Rothman, 1999; Faria, 2002b), as illustrated by the fall in the relative impacts of prestigious department's journals (e.g., Laband and Piette, 1994b) such as Review of Economics and Statistics, International Economic Review and *Economica*.

In order to guarantee non-negative solutions, the following inequalities must hold: (i) $\delta > \rho + 1$ and (ii) $a > (\rho + 1)^2(\delta - \rho - 1)^2$. We can see from inequality (i) that $\delta > \rho + 1 \Rightarrow \delta - \rho - 1 > 0$ which makes, by equations (8) and (9), c^* and q^* positive, respectively. When inequalities (i) and (ii) hold, Q^* is positive by equation (10).

III. THE COMPARATIVE STATICS ANALYSIS

From the steady-state solutions (8), (9) and (10), we can assess the impact of journal's reputation (R), editor's impatience (δ), author's impatience (ρ) and author's opportunity cost (b) on citations (c^*), number of papers published (q^*) and journal's quality (Q^*).

Journal's reputation (R) is influenced by its history and it can also be influenced by the reputation of the department, university, professional association or editorial board responsible for it. The editor's impatience (δ) captures the willingness of the editor in increasing the reputation of his/her journal.

The author's impatience (ρ) is affected by his job prospects and obligations. For example, if some departments demand high-quality publications to grant tenure to their members, it may increase the scholar's rate of time preference. In the same vein, the more research the scholar does, the less leisure he/she gets. Therefore, to publish more, he/she has to do more research, which decreases his/her leisure time and utility level. The parameter b captures the opportunity cost of research and publication.

Concerning the effect of journal's reputation we have

$$\frac{dc^*}{dR} > 0; \quad \frac{dq^*}{dR} = 0; \quad \frac{dQ^*}{dR} > 0$$

i.e., an exogenous increase in journal's reputation leads to more citations and raises the quality of published papers; it does not affect the number of papers published. These results mean that when a journal acquires reputation, it becomes more selective. For a given level of papers published, the raise in journal's reputation allows it to increase the quality level of papers accepted for publication and, as a consequence, increases the number of citations.

The effect of editor's impatience is given by

$$\frac{dc^*}{d\delta} < 0; \quad \frac{dq^*}{d\delta} > 0; \quad \frac{dQ^*}{d\delta} < 0$$

i.e., an exogenous increase in the editor's rate of time preference increases the number of papers accepted for publication (it means that

the rejection rate decreases), decreases the number of citations of papers published by his/her journal and decreases the average quality of the papers published by it. Therefore, a rise of the editor's impatience is associated with a fall in the journal's quality standards. A higher impatience rate means that the editor is too anxious to attract the attention of the public, and hence he/she is more likely to accept a greater number of papers in order to increase submissions and to get noticed.

The impact of author's impatience is as follows

$$\frac{dc^*}{d\rho} > 0; \quad \frac{dq^*}{d\rho} < 0; \quad \frac{dQ^*}{d\rho} > 0$$

An exogenous increase in the scholar's rate of time preference increases the number of citations and the quality of papers and decreases the quantity of papers published. This result means that high job standards make scholars to put more emphasis on the quality of their papers than on the number of publications. Tougher, tenure requirements increase the quality of the scholar's research and its impact in the literature.

The author's opportunity cost affects the model in the following manner

$$\frac{dc^*}{db} < 0; \quad \frac{dq^*}{db} < 0; \quad \frac{dQ^*}{db} < 0$$

The higher the scholar's preference for leisure, the less work he/she is going to do. Consequently, when the scholar does not want to work hard, this will be reflected in a lower number of publications with lower quality level, which decreases the impact of his/her work in the literature.

This model may help explain some stylized facts concerning the evolution of journal rankings. It shows that journal's reputation, editor and author's impatience and author's opportunity cost are important variables that have to be taken into account to explain journal rankings because they influence citations. For instance, Faria (2002b) analyses the main features of the rankings of economic journals previously published (Diamond, 1986; Malouin and Outreville, 1987; Laband and Piette, 1994b; Burton and Phimister, 1995; Stigler *et al.*, 1995; Hodgson and Rothman, 1999) and shows that the relative importance of journals, as captured by the impact factor of citations, is always changing. That is, the relative importance of a given journal cannot be taken for granted because its position in a ranking of journals varies along time. Having said that, it is important to stress that for the top journals, there has been much less change. For example, in the recent journal ranking of Kalaitzidakis *et al.* (2003), the top 10 journals is not too different from the Laband and Piette's (1994a) and Diamond's (1986) list.

The above findings can be related to the theories of scientific communication such as the universalist and the social constructivist view. The universalist view claims that cognitive content and article quality dominate the development of science (Cole and Cole, 1973; Merton, 1973). While social constructivists argue that scientific success is not only associated with scientific merit, and that extra-scientific attributes, such as reputation, social position and the like, play an important role in science (Lindsey, 1978; Latour, 1987).

Indeed, the model presented here captures the essence of both views, since it deals not only with the intrinsic merit of publications, but also with the social environment in which science is done. For instance, one paper published in an academic journal can impact the literature due to its intrinsic scientific qualities and also because of the way science is made, which involves a market of publications, a market of scientists and a market of ideas. This article contributes to the analysis of these issues by identifying the problem, the main agents and some elements that influence the workings of these markets. The problem is to explain how publications, citations and journal's quality are determined. The article describes the scientific social environment as a game where the main players are scholars and editors. In addition, it identifies the factors that affect the outcome of these markets, such as journal's reputation, scholar's opportunity costs and the rate of time preference of authors and editors.

IV. CONCLUDING REMARKS

This article examines a game between authors and editors. It is assumed that journals have some market power and, as a consequence, editors play as leaders and authors are the followers. Authors maximize the number of publications seeking to increase the impact of their work on the literature, captured by citations. Editors maximize the quality of papers they publish taking scholars' behaviour in consideration in order to increase the reputation of their journals.

The model shows that rules aimed at increasing scholars' productivity, such as setting high standards to grant tenure, increase authors' citations and journals' quality. In addition, the editors' willingness to build journal's reputation hurts the quality of their journals and increases the number of publications. This appears to be a counter-intuitive result. However, when editors become more impatient to attract the attention of the public, they are more likely to accept a greater number of papers in order to increase submissions and to make their journals noticed which lower the quality of the papers published by their journals. Finally, journal's reputation increases citations and the average quality of papers published.

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