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Is there a trade-off between domestic and international publications?

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Abstract

This paper examines how a reputation-seeking academic economist allocates his time between research and nonresearch activities to publish papers in domestic and international journals. In equilibrium there is a trade-off between domestic and international publications. One implication is that the observed differences in academic productivity between American and European economists reflected by rankings can be misleading. The model allows for the existence of productive and efficient scholars even when their names do not appear in the rankings. The reason is that some scholars are publishing in domestic rather than in international journals, in accordance with the incentives in their home countries.

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1. Introduction

There is a long tradition in economics in measuring the output of scholars and departments.¹ These measures are usually based on publications in peer-reviewed international journals and/or in citations.² The available empirical evidence provides a positive

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¹ Among the pioneer works are Fusfeld (1956), and Yotopoulos (1961).

² Recent references include Bairam (1994), Medoff (1996), Dusansky and Vernon (1998) and Kalaitzidakis et al. (1999).

relationship between resources for research and ranking position (e.g., Koshal et al., 1996; Fox and Milbourne, 1999; Thursby, 2000), so it is no surprise that these rankings are used to attract grants.

However, rankings based on publications and citations show that North American (especially from the US) academic economists perform much better than others. Frey and Pommerehne (1988), for example, using the number of citations in the Social Science Citation Index over the period 1972–1983, show that the US and Canada provide 72% of all eminent living economists, and only 25% are Europeans.³

According to Frey and Eichenberger (1992, 1993) the significant differences in academic productivity are due to differences in the academic markets in the US and Europe. They argue that the US market is bigger and more competitive and homogeneous than the European market. Moreover, job mobility is almost absent in European markets.

This paper explores another possible explanation – not necessarily separated from the labor markets hypothesis outlined above – for the observed differences. It is argued that economists outside the US have incentives to publish in domestic journals to maximize their value in their respective home countries. The domestic production is seldom captured by rankings, since the rankings take into account international journals, and most of these international journals are Americans or have as editors American economists (see Hodgson and Rothman, 1999). Therefore, there are productive economists outside the US – in that they publish their academic output in peer-reviewed journals – but their effort is not reflected in the rankings because they are publishing in domestic, rather than international journals.⁴

The main hypothesis of this paper is that productive scholars are reputation-seekers in their respective countries. Given that, other things being equal, a better reputation allows the academic economist to profit from his expertise by attracting more sources of income. The point of interest here is to analyze how this reputation-seeking behavior affects the choice of the scholar in publishing internally or externally. The scholar has to establish himself as a high profile academic to gain some respect among peers and to build up his reputation in academia. The quickest way to gain reputation in academia is by publishing in top journals of the area which, in the present context, are represented by international journals. Another way is by obtaining a Ph.D. degree in a first rank international university. After achieving some respectability in academia, the scholar starts to build his reputation outside academia [where additional sources of income lie]. He directs his focus to domestic journals to promote himself in the home country. Thus the scholar has incentives to publish in domestic and international journals.⁵

³ For other indicators, see Portes (1987).

⁴ In this paper all top journals are regarded as international journals. In this sense, despite the American Economic Review being an American journal it is considered to be an international journal even for American economists since it is widely read and respected as a top journal everywhere. The same holds true for the Economic Journal concerning British economists.

⁵ A related line of reasoning argues that as competition for publication in top journals increase [and in this paper top journals are considered international journals], it provokes an increase in the rejection rates as well as increase in the time delay from submission to publication in a top journal (Mason et al., 1992). Therefore, authors tend to diversify their publications across different journals (Chung et al., 1993), among them there are domestic journals. The race towards publication in international journals leads to a trade-off between the number of publications and their quality (Faria, 2003).

The relevant issue is how the scholar balances his efforts between academic and domestic audience. The key question of our investigation is whether a trade-off exists between both objectives. It is expected that an efficient scholar finds himself in a position of such a trade-off. According to our argument, he has incentives to publish in domestic and international journals, however his time and other resources are limited. If resources are free he will increase both publications, because they bring him more satisfaction, reputation and income. So, one must expect that an efficient academic will increase both types of publications until his resources are fully employed. That is, to the point at which an increase in publications in international journal trade-off publications in domestic journals, and vice versa.

The existence of a trade-off between publications in domestic and international journals illustrates the idea that there can be productive and efficient economists whose names do not appear in international productivity rankings of the profession. This occurs because such economists are publishing in domestic journals, and achieving other types of professional targets given by the incentives in their home countries. This idea helps to explain the observed differences in academic productivity between American and European economists.

The paper is organized as follows. The next section presents the basic model. The qualitative analysis of the model appears in section three. Section four uses the model to explain the observed differences in academic productivity between American and European economists. The concluding remarks follow in section five.

2. The reputation-seeking academic economist

The representative agent is a reputation-seeking academic economist that has two different sources of real income: $Y = Y(P, R)$. P is the quantity of papers published in international peer-reviewed journals, and R is the scholar's reputation. As discussed in the introduction, the reputation of the academic economist is an important source of alternative income for the scholar.⁶ Reputation is assumed to depend on publications in domestic journals (D) and on a critical level of academic achievements, given by the parameter a :

$$R = \begin{cases} aD, & \text{if } a > \bar{a} \\ 0, & \text{if } a \leq \bar{a} \end{cases}$$

Therefore, domestic and international publications influence the academic and nonacademic income of the scholar:⁷

$$Y = P^\alpha (aD)^\beta, \quad \alpha, \beta \in (0, 1) \quad (1)$$

Assume there is one composed consumption good (C) in this economy whose price is normalized to the unity. Furthermore, the scholar consumes all his income at every point in

⁶ One may argue that economic theorists have little opportunity to work outside academia in comparison with economists with empirical skills. Therefore they have more incentives to publish in international journals. This is an important distinction that is not taken into account in the present model.

⁷ Eq. (1) is a Cobb–Douglas type production function. It is a well-behaved production function: homogeneous, positively valued, increasing, and regular strictly quasi-concave over the domain $D, P > 0$.

time: $C = Y^8$. The satisfaction he derives from the consumption good (C), described by a logarithmic instantaneous utility function U , given it is a standard increasing and concave functional form:

$$U(C) = \ln C = \alpha \ln P + \beta[\ln a + \ln D] \quad (2)$$

Changes in the stock of publications in peer-reviewed international journals (\dot{P}) depend positively on the effort (E) spent in research and on the actual reputation of the scholar (R):

$$\dot{P} = E(sP) + g(n)R - \Omega \quad (3)$$

where $\Omega > 0$ is a constant.

The effort devoted to research is an increasing function of time allocated to academia (s) and of the actual stock of international publications (P) (see Levin and Stephan, 1991). This means that greater the number of papers published internationally, the wider the experience of the scholar, and easier it is to have further papers accepted for publication in international journals:

$$E(sP) = \ln(1 + s) + b \ln P \quad (4)$$

Reputation affects positively the change in the stock of international publications because it is easier for a scholar with reputation to publish his work in international journals. However, one can interpret Eq. (3) on the other way around. That is, reputation increases with an increase in the number of papers published in international journals. The representative economist allocates his time (normalized to the unity) between two activities, research (s) and nonresearch (n): $s + n = 1$. As explained earlier, reputation-seeking is a costly activity requiring time to publicize himself outside academia. Function g in Eq. (3) reflects this cost: $g(n) = m(1 - s)$, $m > 0$.

The problem of the reputation-seeking academic economist is to maximize the discounted sum of instantaneous utilities subjected to the changes in the stock of publications in peer-reviewed international journals (\dot{P}). In order to solve this problem the representative reputation-seeking scholar controls the time devoted to research (s) and the reputation level to achieve his objective. Notice, however, that reputation is an increasing function of the number of domestic publications (D). Consequently, the scholar controls the number of domestic publications to achieve reputation and hence to solve his problem.⁹

$$\text{Max}_{s,D} \int_0^{\infty} \{\alpha \ln P + \beta[\ln a + \ln D]\} e^{-rt} dt$$

⁸ It is assumed that scholar's income [output] growth rate is equal to a positive number, $\dot{Y}/Y = g$. Since α and β are positive parameters, this implies by the production function in equation (1) that the number of publications in international (P) and domestic (D) journals is limited from above and, consequently, finite. This is not an unrealistic assumption given that even the most prolific scientists ever, such as Leonhard Euler or Paul Erdos, published no more than a couple of thousand papers.

⁹ For models with similar framework and related issues see Faria (1998, 2001, 2002).

s.t. $\dot{P} = \ln(1 + s) + b \ln P + m(1 - s)aD - \Omega$
 where r is the subjective rate of time preference.
 The Hamiltonian of the optimal problem is:¹⁰

$$H = \alpha \ln P + \beta [\ln a + \ln D] + \lambda [\ln(1 + s) + b \ln P + m(1 - s)aD - \Omega]$$

where λ denotes the co-state variable for the state variable P , which gives the marginal valuation of the quantity of papers published in international journals at a given point on time.

According to the maximum principle, the first order conditions of the scholar’s problem are:

$$\frac{1}{1 + s} - maD = 0 \Rightarrow maD = \frac{1}{1 + s} \tag{5}$$

$$\frac{\beta}{D} + \lambda m a(1 - s) = 0 \tag{6}$$

$$\dot{\lambda} - r\lambda = - \left[\frac{\alpha}{P} + \lambda \frac{b}{P} \right] \tag{7}$$

Plus the transversality condition: $\lim_{t \rightarrow \infty} P\lambda e^{-rt} = 0$.

This framework allows us to investigate the existence of a trade-off between domestic (D) and international publications (P). As both variables are endogenously determined by the model, the problem is tackled by assessing how these variables respond to changes in the parameters of the model [b , α , β and r]. There is a trade-off if domestic and international publications respond inversely to changes in the parameters.

3. Qualitative results

In order to assess the impact of the parameters in the model, consider the steady state equilibrium below:

$$\dot{\lambda} = 0 \Rightarrow \lambda = \frac{\alpha}{rP - b} \tag{8}$$

$$\dot{P} = 0 \Rightarrow \ln(1 + s) + b \ln P + m(1 - s)aD = \Omega \tag{9}$$

¹⁰ The boundedness assumption on the maximand integral which we require for a solution to exist in the infinite horizon case is provided by the following condition : $\int_0^\infty [U(C)]e^{-rt} dt = \int_0^\infty [U(Y)]e^{-rt} dt = \int_0^\infty [\ln(Y)]e^{-rt} dt = \int_0^\infty [\ln(e^{gt})]e^{-rt} dt = \int_0^\infty [gt]e^{-rt} dt < \int_0^\infty e^{gt} e^{-rt} dt$ is a finite number, which holds true if $r > g$.

Substituting Eq. (8) into (6) yields:

$$\frac{\beta}{D} + \frac{\alpha}{rP - b} ma(1 - s) = 0 \quad (10)$$

Notice that the system formed by Eqs. (5), (9) and (10) determines the equilibrium values of time allocated in research (s), number of international publications (P), and number of domestic publications (D). Additionally, note that the existence of economically meaningful steady state solutions that are given by positive values of s , D and P depend on the following inequality: $b > rP$.

Simplifying matters we can substitute Eq. (5) into Eqs. (9) and (10):

$$\ln(1 + s) + b \ln P + (1 + s)^{-1}(1 - s) = \Omega \quad (9')$$

$$\beta + \frac{\alpha}{rP - b}(1 + s)^{-1}(1 - s) = 0 \quad (10')$$

Equations (9') and (10') allows us to find the equilibrium values of s and P .

In order to investigate the impact of parameters on the equilibrium values of s and P , we need to totally differentiate of equations (9') and (10'), which yields:

$$\begin{aligned} & \begin{bmatrix} r\beta & -\alpha[(1 + s)^{-2}(1 - s) + (1 + s)^{-1}] \\ b/P & -(1 + s)^{-2}(1 - s) \end{bmatrix} \begin{bmatrix} dP \\ ds \end{bmatrix} \\ & = \begin{bmatrix} -\beta[Pdr - db] + (b - rP)d\beta - (1 + s)^{-1}(1 - s)d\alpha \\ -\ln P db \end{bmatrix} \end{aligned} \quad (11)$$

From (11) it is easy to do the comparative statics analysis for s and P , which appears in the Appendix. As it is clear from equations A1–A8 in the Appendix the impact of the parameters b , α , β and r on P and s have the same sign. As a consequence, we can infer that the number of papers published in international journals (P) and the time spent in academic activities (s) are positively related.

Concerning the number of domestic publications (D), note that from Eq. (5) one has: $(dD/ds) = -D/(1 + s) < 0$. That is, the time allocated to academic activities is negatively related to domestic publications, which implies that the number of publications in domestic journals (D) is negatively related to the number of publications in international journals (P). This characterizes the existence of a trade-off between domestic and international publications. It is important to highlight that the trade-off is an optimal solution for the problem of the reputation-seeking economist. Actually, one can see from equations A11–A14 in the Appendix that the impact of the parameters of the model given by b , α , β and r on the optimal number of domestic publications, D , have the inverse sign of their impact on s and P .

Fig. 1 depicts the linearized version of the model (where P^* , s^* , D^* , denote the steady-state equilibrium):

From Fig. 1 it is clear that any parameter that shifts the lines described by equations (9') and (10') will change the equilibrium values of s and P in the same way. For example, if one

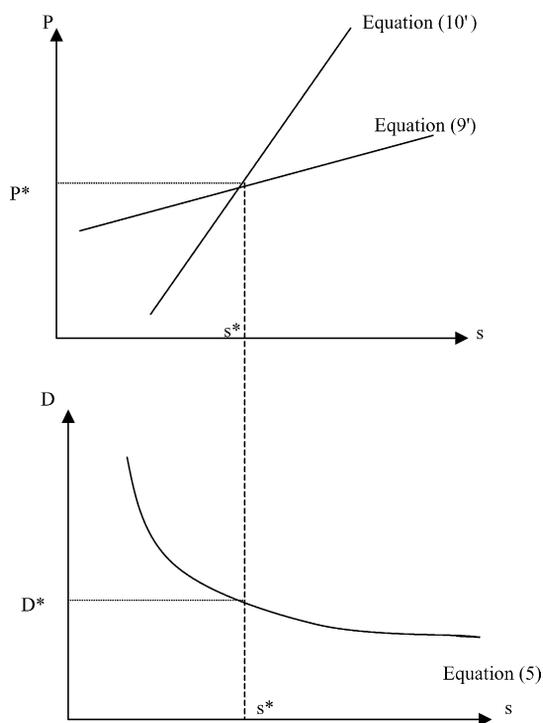


Fig. 1. Linearized version of the model.

parameter increases P , it will increase s and vice versa. Moreover, the figure also shows that there is a negative relationship between s and D . Therefore, any parameter that increases s decreases D . Hence, any increment in the number of international publications (P) implies a reduction in the number of domestic publications (D).

The trade-off between international and domestic publications is described by Fig. 2. It reproduces Fig. 1 in the Northeast and Southeast quadrants. The Southwest quadrant just changes the axis of domestic publications by a 45° line. Finally, the Northwest quadrant relates domestic with international publications and it is easy to see that there is a trade-off between them.

Fig. 2 shows that any parameter change that decreases the time allocated in research (s), shifting the line given by equation (10') to the left, will decrease the number of international publications (P) and, as a consequence, will increase the number of domestic publications (D).

For example, assume that the sign of the Jacobean is negative: $\Delta = [2\alpha(b/P) - r\beta(1 - s)](1 + s)^{-2} < 0$. The model shows that an increase in the income elasticity of international publications, given by α , and/or an increase in the subjective rate of time preference, given by r , decrease s and P . According to the comparative statics analysis, the number of domestic publications (D) rises with α and/or with r . Fig. 2 describes the adjustment in the endogenous variables of the model, which allows us to construct a curve linking domestic

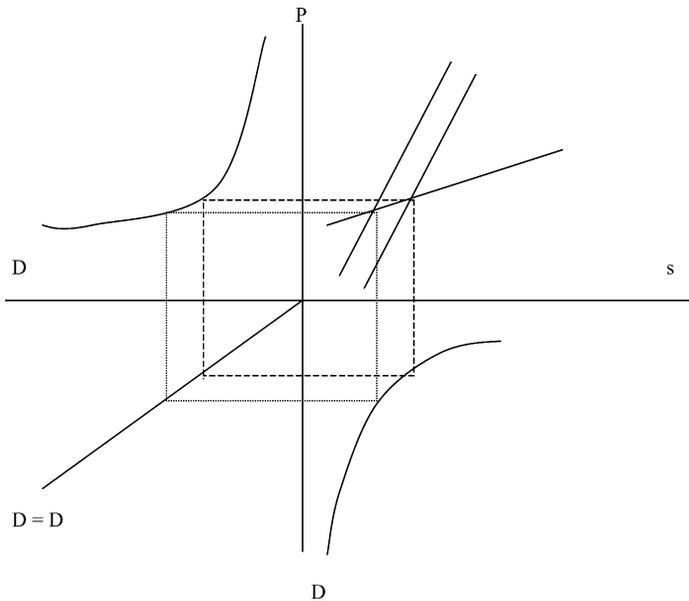


Fig. 2. The trade-off between international and domestic publications.

and international publications. In addition, notice that this curve has a negative slope. Fig. 2 provides a geometrical interpretation of the trade-off between domestic and international publications.

4. Academic economists in Europe and America

Thus far, we have shown that a trade-off between domestic and international publications arises as an optimal equilibrium solution for the reputation-seeking academic economist. The combination of the trade-off with the academic labor market structure in Europe and America (along the lines of Frey and Eichenberger, 1992, 1993), help to explain the observed differences in academic productivity between European and American economists.

In the US, given the competitive structure of the academic market, economists have to allocate a greater part of their time in academic activities (s). In the model presented above, an increase in s is associated with an increase in international publications (P). If s is increasing, the time allocated to activities outside of academia ($1 - s$) is reducing. As shown above, this time is used by the scholar to build reputation outside academia, which involves publication in domestic journals (D). Therefore, an increase in s will decrease D .

In Europe—where the academic labor markets are more heterogeneous, smaller and less mobile than in America—given the government intervention in the economy, economists have incentives to spend more time in activities outside academia ($1 - s$). That is, in Europe, government intervention induces academic economists to invest their human capital in specific knowledge of local economic problems and institutions. As a result, reputation

is associated with power, influence and status that are attached to activities related to the government intervention. Therefore, more time spent with specific domestic problems leads to less time to spend in problems considered relevant by the literature published in international journals. That is, an increase in $(1 - s)$ leads to an increase in domestic publications (D), and a reduction in s which leads to a reduction in international publications (P).

The empirical implication of the model is quite simple. Taking into account two productive and efficient economists, one from the US and other from Europe, the model says that the European will have a greater number of publications in domestic journals vis-à-vis the American, while the American will have a greater number of publications in international journals. For example, take all parameters as equal, except the rate of time preference r . If the European's rate of time preference is greater than the American's, the European will have more domestic and less international publications than the American.

5. Concluding remarks

The productivity rankings show a remarkable difference in the performance of American and European economists. It appears that American economists are more productive than their European counterparts. This paper proposes an explanation for the observed differences. It is argued that economists outside the US have incentives to publish in domestic journals (that are not accounted for in these rankings) to maximize their value in their respective home countries. That is, economists outside the US can be productive – in the sense they publish their academic output in peer-reviewed journals – but their effort is not reflected in the rankings because they are publishing in domestic, rather than international, journals.

The central hypothesis of this paper is that productive scholars are reputation-seekers in their respective countries. Given that a better reputation, *ceteris paribus*, allows the academic economist to profit from his expertise by attracting more sources of income. The paper analyzes how this reputation-seeking behavior affects the choice of the scholar in publishing domestically or internationally. The scholar has to establish himself by gaining reputation in academia and outside academia. In order to gain a reputation in academia he has to publish in the top journals in the field (given by the international publications). Reputation outside academia is related to publications in domestic journals. Thus the scholar has incentives to publish in domestic and international journals. Considering that his time and other resources are limited, one must expect that an efficient academic will increase both types of publications until his resources are fully employed. At this point an increase in publications in international journals trade-off publications in domestic journals, and vice versa.

The paper presents a model in which a reputation-seeking academic economist decides how to allocate his time between research and nonresearch activities in order to publish papers in domestic and international journals. A trade-off between domestic and international publications is derived as the optimal equilibrium of the model.

The combination of the trade-off between domestic and international publications with the academic labor market characteristics in the US and Europe, leads to the result that the observed differences in productivity reflected by the rankings can be misleading. That is,

the model allows for the existence of productive and efficient scholars even in the case their names do not appear in the rankings. The reason is that some scholars are publishing in domestic rather than in international journals, which is consistent with the incentives they face in their home countries.

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Appendix A

The signs of the comparative statics results below, depend on the sign of the Jacobean:

$$\Delta = [2\alpha(b/P) - r\beta(1-s)](1+s)^{-2}$$

$$\frac{dP}{db} = \Delta^{-1}\{-(1+s)^{-2}(1-s)\beta - \alpha \ln P[(1+s)^{-2}(1-s) + (1+s)^{-1}]\} \quad (\text{A.1})$$

$$\frac{dP}{d\alpha} = \Delta^{-1}[(1+s)^{-3}(1-s)^2] \quad (\text{A.2})$$

$$\frac{dP}{d\beta} = \Delta^{-1}[-(b-rP)(1+s)^{-2}(1-s)] \quad (\text{A.3})$$

$$\frac{dP}{dr} = \Delta^{-1}[r\beta(1+s)^{-2}(1-s)] \quad (\text{A.4})$$

$$\frac{ds}{db} = \Delta^{-1}[-(b/P) - r \ln P]\beta \quad (\text{A.5})$$

$$\frac{ds}{d\beta} = \Delta^{-1}[-(b-rP)(b/P)] \quad (\text{A.6})$$

$$\frac{ds}{dr} = \Delta^{-1}b\beta \quad (\text{A.7})$$

$$\frac{ds}{d\alpha} = \Delta^{-1}[(b/P)(1+s)^{-1}(1-s)] \quad (\text{A.8})$$

Notice that by equation (5):

$$\frac{dD}{ds} = \frac{-D}{1+s} < 0, \quad (\text{A.9})$$

therefore the signs of D in relation to the parameters $b, \alpha, \beta,$ and r have the inverse sign of their impact on s :

$$\frac{dD}{db} = \frac{dD}{ds} \frac{ds}{db} \quad (\text{A.10})$$

$$\frac{dD}{d\beta} = \frac{dD}{ds} \frac{ds}{d\beta} \quad (\text{A.11})$$

$$\frac{dD}{d\alpha} = \frac{dD}{ds} \frac{ds}{d\alpha} \quad (\text{A.12})$$

$$\frac{dD}{dr} = \frac{dD}{ds} \frac{ds}{dr} \quad (\text{A.13})$$

$$\frac{dD}{da} = \frac{-D}{a} < 0 \quad (\text{A.14})$$

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