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# What Makes a Working Paper in Economics Publishable? A Tale from the Scientific Periphery

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AURORA A. C. TEIXEIRA

*Research on scientific production and publications in the field of economics has positively boomed in the last few years. However, hardly any attention has been dedicated to the production of working papers and the consequences they may have within the institutions where they are produced. This paper provides a detailed analysis of the working papers produced and published from an institution that is relatively peripheral in terms of its production of research in economics. It mainly explores the probability of the working papers being published in peer-reviewed journals. Through the use of an extensive series of these working papers, produced between 1985 and the end of 2005, and through the estimation of a logistic regression model, it was concluded that the probability of international publication increases significantly when the working paper is recent and co-written with a researcher from a foreign institution. Such evidence suggests that for success in the ‘publish or perish’ world of scientific research, one has to be integrated into an international scientific network.*

*Keywords: economics, working papers, probability of publication, science, Portugal*

## 1. INTRODUCTION

Due to the long-standing North American tradition of using scientific journals as a means to disseminate and exchange knowledge, the practice of quantifying the papers published in those journals as the main indicator of ‘scientific production’ has become widespread.<sup>1</sup> This widespread practice is usually expressed in terms of the different types of ‘products’<sup>2</sup>: papers in peer-reviewed journals (either national or international in terms of their circulation), books (or chapters in books), theses, reports, working papers, and so on.

The ranking of scientific institutions (i.e., universities and their faculties) and authors is normally based on the number of publications in international journals (indexed usually in bibliographic databases such as ISI [Institute of Scientific Information], Scopus or EconLit). This is because a paper published in a journal has had its content validated through the peer-review process, whereas other material written has not necessarily been subjected to a comparable quality-control mechanism.

In recent years, research work on scientific production and publication in the field of economics has proliferated, especially with regard to the United States of America<sup>3</sup> and to samples involving groups of European countries.<sup>4</sup> Using publications in international journals in the period 1980–1994, Mata provides a brief characterization of the state-of-the-art contributions of economics research in Portuguese departments.<sup>5</sup> More recently, Guimarães<sup>6</sup> broadened Mata's work by analysing data up to 2000. Guimarães examined different aspects of Portuguese researchers' publication habits and provided measures of the effective impact of these publications based on how often they were cited in other papers.

It is quite common for academic institutions, especially the more dynamic ones in terms of research, to publish their own series of working papers on 'current research.' Nevertheless, research work focusing on working papers is scarce. To my knowledge, Brasão and Lima<sup>7</sup> are the only authors who have reflected on the publication dynamics of working papers from Portuguese research institutions and the rate of these papers' publication in international peer-reviewed journals. The authors analysed the case of eight institutions in the field of economics that publish series of working papers (up to 2000). They concluded that the advantages of publication are obvious: Apart from making the research by members available for discussion, the working papers are an important contribution not only because they create the necessary environment for successful scientific research (i.e., research published in international peer-reviewed journals) but also because they boost the scientific performance of academic institutions.<sup>8</sup> However, the authors do not seek to determine the subject institutions' success rate of transforming working papers into articles published in international journals. Instead, the authors only show how the publication of working papers in the institutions studied was on the whole correlated with publication in international journals of research produced in those same institutions. As there are, in fact, papers published in journals that were never published previously

as working papers, this analysis overestimates the subject institutions' effective 'success rates.'

In the present study, I seek to bridge this gap by examining in one single institution—Faculdade de Economia, University of Porto (FEP)—those working papers that were published (whether in national or international journals or as chapters in books) and then evaluating the statistical importance of the (possible) factors that affect the probability of being published both at the national and international levels.

Given the importance of publications in the classifying of institutions and authors, it seems highly relevant to reflect on the process (or at least on part of the process) underlying the 'production' of peer-reviewed knowledge by researchers from a given higher education institution (in this case, FEP) by examining the evolution and characteristics of working papers produced over a twenty-year period (1985–2005).<sup>9</sup> In this respect, one has to know more to perform better.

This paper is structured as follows. Section 2 presents a brief comparative overview of the evolution of four Portuguese universities' production of working papers and performance in terms of publication in journals of international circulation (included in EconLit). Section 3, focusing only on the case of FEP, describes in more detail the dynamics of scientific production in the form of working papers in a twenty-year period (1985–2005). Section 4 analyses the relative importance, and corresponding evolution, of the research areas associated with the working papers. Section 5 provides an econometric analysis of the determinants of publication of working papers produced between 1985 and 2005. Finally, Section 6 concludes with the study's main results.

## 2. DYNAMICS OF SCIENTIFIC PRODUCTION IN FOUR PORTUGUESE INSTITUTIONS IN THE FIELD OF ECONOMICS: A BRIEF COMPARATIVE ANALYSIS<sup>10</sup>

Faculdade de Economia, University of Porto (FEP) is among the Portuguese academic institutions in the field of economics with one of the longest-running series of working papers (starting in 1985), started shortly after the Faculdade de Economia, New University of Lisbon's (FE/UNL) series, which began in 1983. By 2005, the latter was the institution with the highest accumulated number of working papers (see Figure 1b). At the end of 2005, FE/UNL had 475 working papers while the Escola de

Economia e Gestão, University of Minho (EEG/UM) had 239 and FEP had 197 (223 if the CETE's discussion papers are included<sup>11</sup>).

Despite this large difference in absolute numbers, recent trends in the last three years of data (2003–2005) point to greater dynamism on the part of EEG/UM and FEP. These institutions produced in this period on average thirty-seven and thirty-four working papers respectively per year. Meanwhile, FE/UNL produced eighteen and Faculdade de Economia, Universidade de Coimbra (FE/UC) produced only nine (see Figure 1a).

It seems worthwhile to conduct an overall comparison, albeit simplified and rough, between the evolution in the production of working papers in each of these institutions and the corresponding dynamics of publication in international journals. To this end, and in line with Brasão and Lima,<sup>12</sup> I have taken into account publications in the international journals included in EconLit up to mid-2005.

As is the case with the production of working papers, FE/UNL's performance is also notable in terms of the number of publications recorded in EconLit: an average of twelve articles per year in the last three years, compared to six from FEP and EEG/UM (Figure 2). Notwithstanding the fact that no adjustments were made for co-authored papers or for the period between the production of the article and its publication, and the fact that some of the articles had never been previously published as working papers, a reasonably high correlation can be observed between the number of working papers an institution produces and the corresponding output in terms of international publications. The magnitude of Pearson's correlation coefficient between working papers and publications is similar in the cases of FEP and FE/UNL (around 0.33) whereas it is higher for EEG/UM (at 0.55). Thus, there seems to be a positive association between the production of working papers and the scientific performance of the institutions analysed.

It can therefore be assumed that the existence of working papers tends to boost (and also reflect) an organizational environment that favours high-quality scientific research. However, in order to exclude the possibility of 'dual causality' (i.e., the possibility that a pronounced dynamism in intentional publication stimulates the production of working papers), a more refined analysis is required that examines whether or not each working paper (in the group of institutions under study) had been published.

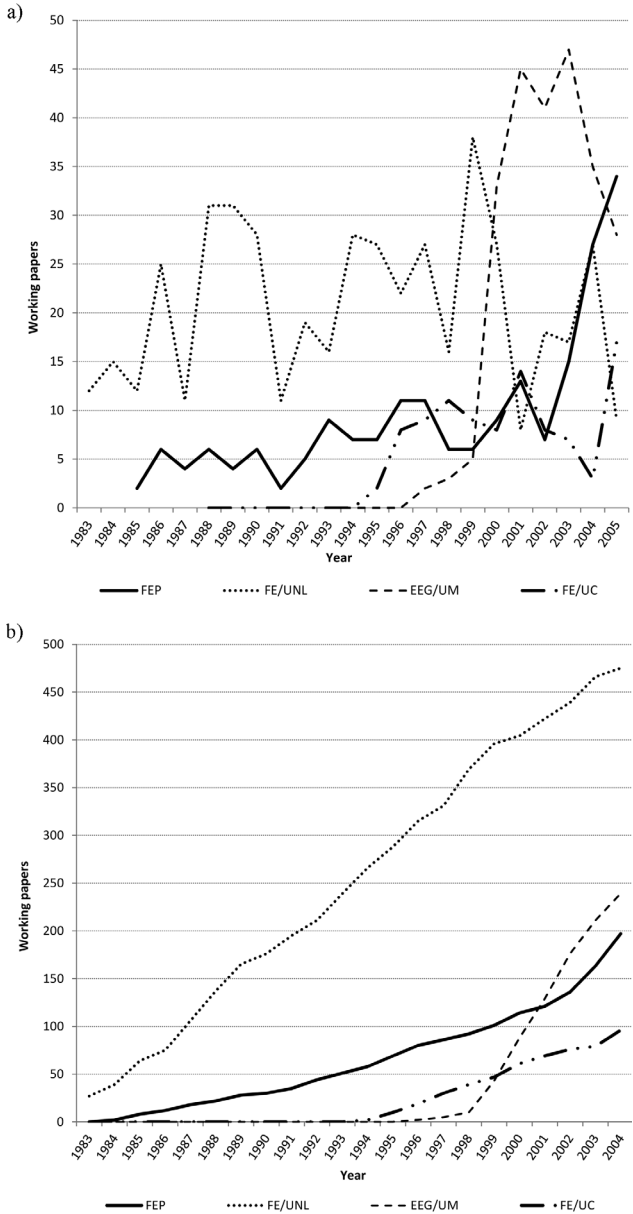


FIGURE 1. Working papers produced per institution (a) per year and (b) in total

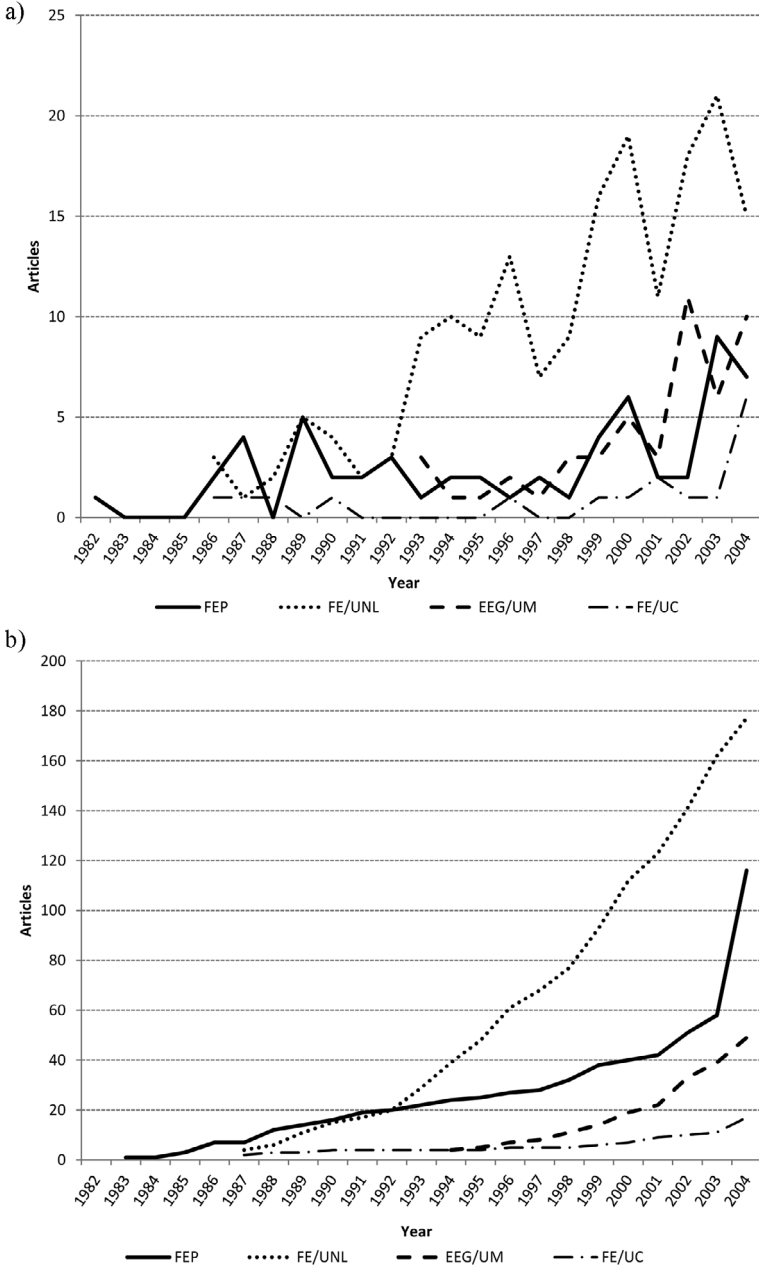


FIGURE 2. Articles published in international peer-reviewed journals included in EconLit per institution (a) per year and (b) in total

In the following section, admitting that the dynamics at the level of the production of working papers is an important factor in promoting the scientific performance of institutions in terms of international publication, I will focus exclusively on the case of FEP's working papers. I will seek to detail the respective dynamics and characterizing factors and to find the possible determinants of the probability of publication of this institution's working papers.<sup>13</sup>

### 3. DYNAMICS OF SCIENTIFIC PRODUCTION AT FEP BETWEEN 1985 AND 2005

Between 1985 and 2005, the dynamics of FEP's scientific production, in terms of current research (working papers), evolved in a highly favourable manner, expanding remarkably in the last five years. Compared to 1999, the number of working papers more than doubled by the end of 2005. It should be noted that the number of working papers produced between 2000 and 2005 represents 53.3 per cent of FEP's total working papers (see Figure 3).

Scientific performance in terms of published working papers has also been quite remarkable in the last few years (Figure 4). Of the fifteen working papers produced in 2003, nine (60 per cent) were published in international peer-reviewed journals (included in EconLit and other

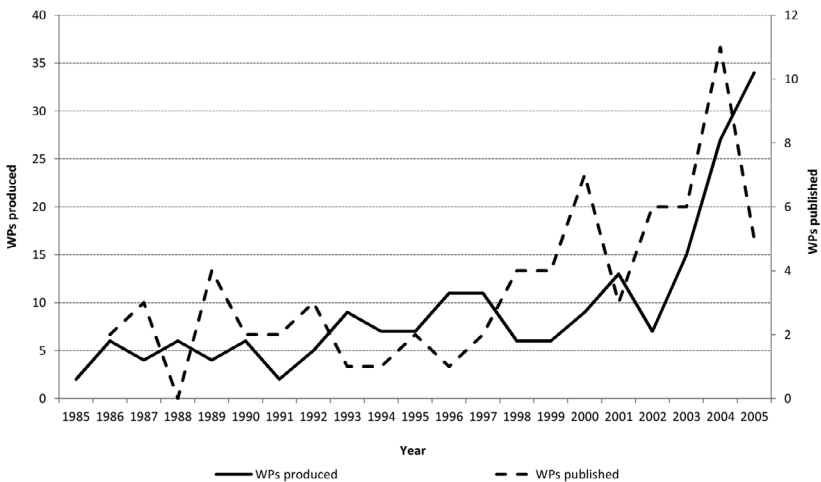


FIGURE 3. Working papers produced and published per year

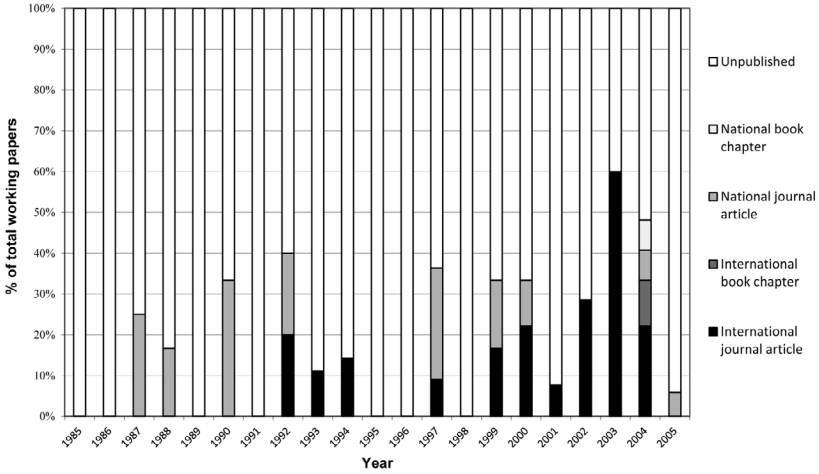


FIGURE 4. Publication status of working papers produced between 1985 and 2005

indexes). The next year (2004), the dynamic was also remarkable: About half of the twenty-seven working papers produced were published, although in this case, five were published as chapters in books (three international and two national) and seven were published in peer-reviewed journals (of which six were international journals).

Given that the dissemination process of scientific production is not immediate—between the production and publication of a certain article, there is usually a span of one to four years—it is noteworthy that, by 2007, two papers from 2005 had already been published in national journals.<sup>14</sup>

4. EVOLUTION OF THE POPULARITY OF RESEARCH AREAS AND EVOLUTION OF THE PORTUGUESE ECONOMY

University research is governed by standards of quality and integrity, but it is not in any way estranged from the world around it. University researchers’ choice of research subjects may be influenced by the perception of the impact and interest that these subjects may come to have within the scientific community and on socio-economic reality (Figure 5).<sup>15</sup> For this study, the *Journal of Economic Literature’s* set of subject areas was used.



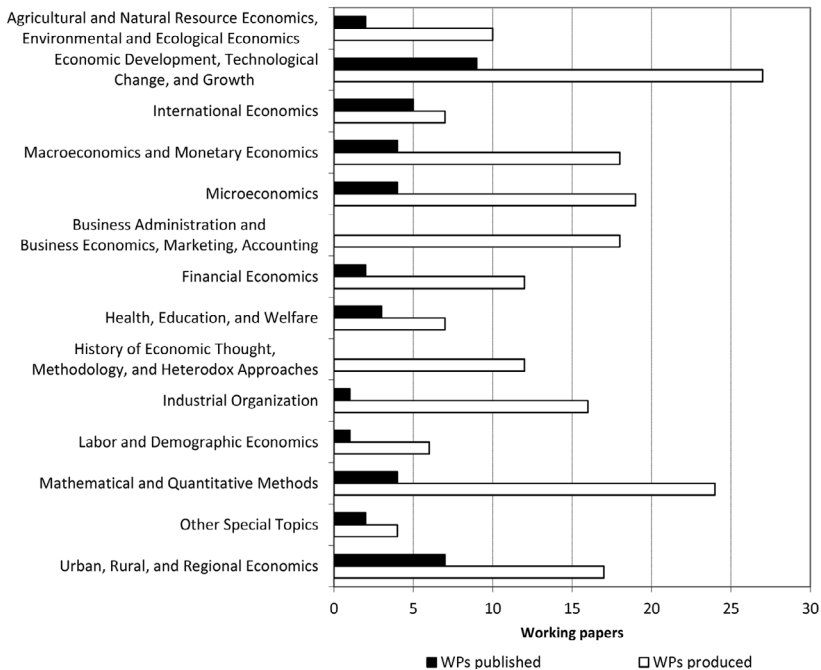


FIGURE 5. Distribution of working papers produced between 1985 and 2005 by subject area

The areas with greatest weight in terms of the number of working papers produced in the last twenty years were ‘economic development, technological change, and growth’ (twenty-seven papers, or 13.8 per cent of the total) and ‘mathematical and quantitative methods’ (twenty-four papers, or 12.3 per cent). The area ‘urban, rural, and regional economics’ was also extremely popular, being the subject of seventeen working papers (8.7 per cent of the total). Excluding the categories of ‘business administration and business economics, marketing, and accounting’ and ‘schools of economic thought and methodology’, which to my knowledge have no published working papers, the categories in which most of the produced working papers belong tend to correspond, loosely speaking, to the most common categories of published working papers. The three areas with the highest number of published working papers are, in decreasing order, ‘economic growth, technological change and growth,’ ‘urban, rural, and regional economics,’ and ‘international economics.’ Altogether, these three areas contain over half (52.3 per cent) of the total (forty-seven) working papers published until the end of 2005.

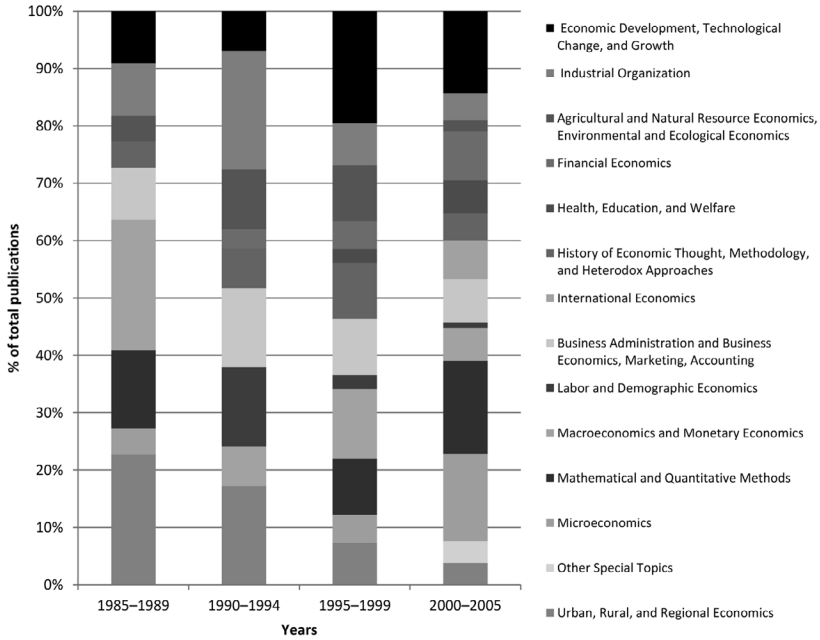


FIGURE 6. Relative popularity of subject areas in each period

If, on the one hand, the impact of scientific research depends on time, on the other, it is a function of space. One dimension is that university researchers desire that their research have an impact on the scientific community. Another dimension in the analysis of the impact of scientific research, particularly that which is accomplished in universities, is the repercussions it has outside the academic setting, especially in the regional and entrepreneurial spheres. Thus, it is also worthwhile to examine the evolution of the relative popularity of the different areas in the twenty-year period of analysis, and to check to what extent this may reflect the specific socio-economic circumstances of the period (Figure 6).

Almost half the working papers produced by FEP in the first five years (1985-1989) were centred on the areas ‘macroeconomics and monetary economics’ and ‘urban, rural, and regional economics.’ When the fact is taken into account that a significant part of scientific research tends to focus on issues in the recent past, for which statistical information is available for analysis, it is not surprising that a very high number of

working papers focus on macroeconomics and monetary economics, as well as regional economics. In fact, the period immediately before 1985 was marked by constant concerns with aspects of monetary policy—namely, those associated with Portugal complying with its second agreement with the IMF and the corresponding need to stabilize the balance of payments. In the following period (1990–1994), particular attention was paid in the working papers to the areas of industrial organization economics and labour economics. This focus reflects concerns with market organization, including the labour market, and questions of liberalization and competition that marked the period following Portugal's entry into the European Economic Community. The post-1995 period reveals the primacy of issues related to convergence, development, and economic growth, and particular emphasis is placed on the role of innovation and technological advancement in this context. Associated with these issues, it should be noted that two areas emerged between 1995 and 2005 that had been relatively ignored until then: 'health, education, and welfare' and 'international economics.'

Due to a greater need at the international scientific level to formalize and provide microeconomic arguments for phenomena, there has been significant growth in the relative importance of the areas 'mathematical and quantitative methods' and 'microeconomics'. 'Financial economics' also appears to be of growing importance from 1995 on, in parallel with a world in which stock market dynamics attract an increasingly greater volume of investments and, consequently, invite greater scientific efforts to understand the corresponding behaviours.

##### 5. ECONOMETRIC ANALYSIS OF THE DETERMINANTS OF THE PUBLICATION OF WORKING PAPERS PRODUCED BETWEEN 1985 AND 2005

Accuracy in the results of this analysis required collecting varied information on each of the 197 working papers produced between 1985 and 2005. First, information was gathered on the intrinsic characteristics of the papers, particularly the number of pages and authors. Between 1985 and 2005, the average number of authors and pages per working paper (WP) was around 1.5 and 25 respectively. There was a slight rise in the average number of authors from the start to the end of this period, whereas the average number of pages per WP has remained relatively stable at about twenty-five, except for a few significant variations in 1986 and 1991 (Figure 7).



FIGURE 7. Average number of authors and pages per working paper between 1985 and 2005

Further data was collected on the characteristics of each author—namely his or her academic status within the institution at the date of the working paper’s publication. The categories are assistant lecturers (including interns and visiting lecturers), assistant professors (including visiting professors), associate professors (including tenured professors) and full professors.<sup>16</sup>

About 55 per cent of the working papers produced between 1985 and 2005 are by individual researchers. When there is collaboration, a large majority of cases (85 per cent) involve two authors. Thirteen working papers (7 per cent of the total) resulted from collaboration between three authors. Given that part of the working papers are the result of co-authorship, as can be seen in Figure 8, the professional category (at the date of publication) that is responsible for the greatest number of working papers (eighty-five, or 43 per cent) is that of the assistant professors, followed (at a rather significant distance) by assistant lecturers (forty-four WPs, or 22 per cent) and associate professors (twenty-six, or 13 per cent). When analysing collaborations across categories, it is interesting to note that they follow the form of an inverted U: There is not a lot of collaboration between assistant professors and assistant lecturers (4 per cent) or between associate professors and assistant professors (3 per cent), but there is more co-operation happening between associate professors and assistant lecturers (6 per cent).

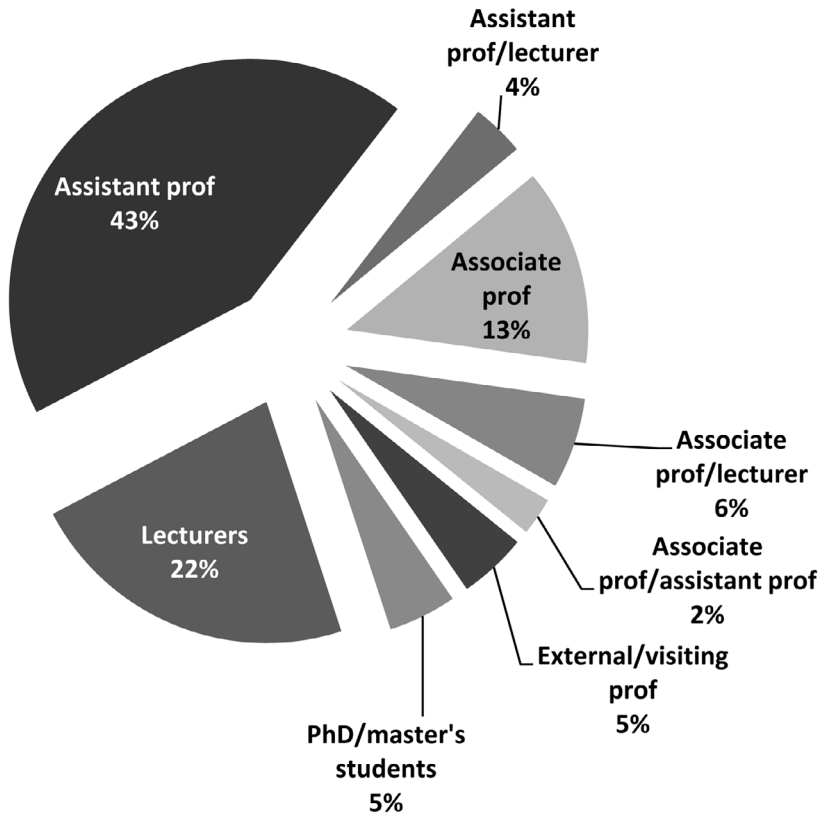


FIGURE 8. Academic status of authors of working papers, 1985–2005

*Note:* Two academic statuses in a category name indicate collaboration between two or more individuals of differing status. Categories named after only one academic status encompass working papers written by sole authors as well as those co-authored by researchers with the same academic status.

Production and publication (in national and international journals) of FEP’s working papers occurs in a relatively small group of researchers. The ten researchers who have produced the most working papers are responsible for about half of those published between 1985 and 2005. Adjusting output for co-authorships—for example, crediting only a third of a working paper to an author who had two co-authors—does not significantly alter the rankings of the most productive authors. However, when the cases of two of the three researchers with the highest number

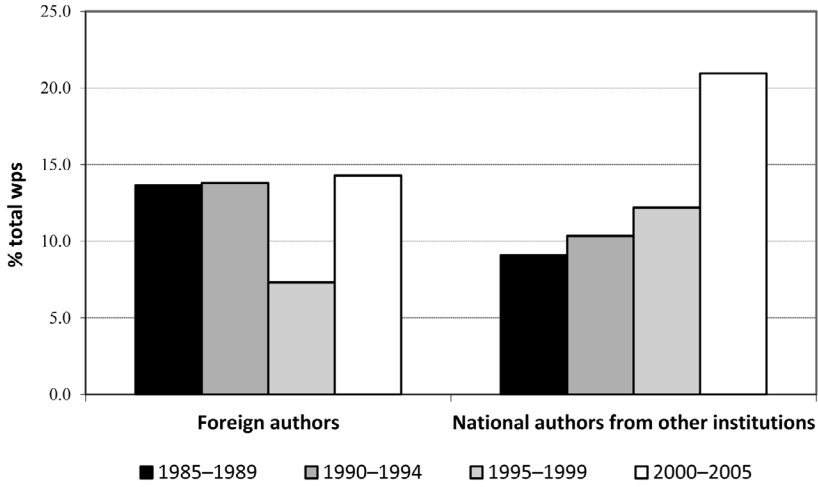


FIGURE 9. Working papers produced in co-authorship with researchers from foreign and other national institutions

of working papers are excluded, the rankings are substantially altered when ordered by the adjusted number of working papers published in national and international journals. The three most productive authors in terms of published working papers are responsible for about one-third of the respective total (forty-one).

It should be noted that although collaboration with authors from foreign (13 per cent of working papers) or other national institutions (16 per cent) is not particularly high, they have grown, especially in terms of collaborations with researchers from other national institutions (Figure 9).

As was already mentioned, the areas in which the greatest number of working papers were produced are ‘economic development, technological change, and growth’ (twenty-seven WPs), and ‘mathematical and quantitative methods’ (twenty-four WPs). The next three most productive scientific areas are ‘microeconomics,’ ‘macroeconomics and monetary economics,’ and ‘business administration and business economics, marketing, accounting’. The top five areas account for 54 per cent of all working papers produced between 1985 and 2005.

On average, during the period under analysis, 40 per cent of working papers explicitly focused on Portugal. However, there are periods, like 1986-1989, 1991-1995 and 1997, for example, that are relatively more

focused on Portugal. The most recent period of analysis (2000–2005) reveals a lower level of preference for matters related to the Portuguese economy.

When the years under study are divided into smaller periods, it is clear that over half of the total working papers were produced in the last period (2000–2005). This seems to be closely linked to the fact that progression in academic careers and the ranking of schools and authors has increasingly come to be based on the production of research.

In light of this recent imperative, it was considered worthwhile to broaden the analysis to the factors underlying the probability of external publication (especially in national and international peer-reviewed or refereed journals) of FEP's working papers. To achieve this end, an appropriate multivariate econometric technique was used.

Thus, the nature of the data relative to the variable I aim to explain—published (1) or not published (0)—dictates the choice of estimation model. As was explained elsewhere, 'Conventional econometric techniques, in a context involving a discrete dependent variable, are not a valid option. In fact, the premises that are necessary in the hypothesis testing of conventional regressions are necessarily violated—it is not reasonable to assume, for instance, that the error distribution will be regular.'<sup>17</sup> Furthermore, in an analysis of multiple regressions the predicted values cannot be interpreted as probabilities—they are not necessarily restricted to the interval between 0 and 1. The approach adopted, therefore, falls within the general probabilistic models.

$Prob(\text{event } j \text{ occurs}) = Prob(Y = j) = F[\text{relevant effects: parameters}]$ .

In the model of probability of external publication of working papers, there is a set of factors such as the characteristics of the article (viz., number of pages and number of authors), academic category of the author(s), degree of external collaboration, research area and time period between working paper creation and publication—included on vector  $X$ —that tend to explain the result, such that

$Prob(Y = 1) = F(X, \beta)$  e  $Prob(Y = 0) = 1 - F(X, \beta)$

The set of  $\beta$  parameters reflects the impact of the alterations operating on  $X$  on the probability of publication. The problem at this stage is to build an appropriate model for the right-hand side of the equation. The base requisite is that the model should produce predictions that are consistent with the underlying theory.

Partially for reasons of mathematical convenience, the logistic distribution  $Prob(Y = 1) = \frac{1}{1 + e^{-\beta'X}}$  has been used in many applications.<sup>18</sup>

According to the available literature,<sup>19</sup> the articles' characteristics—namely, their size (number of pages) and number of authors—tend to partially explain the probability of publication. Furthermore, a researcher's academic/professional category can be interpreted as a proxy (albeit rough) for years of experience in his or her area of expertise. Thus, it is safe to assume that if an assistant lecturer (holding at most a master's degree) is compared with an associate professor (holding a PhD, appraised in a public tenure with an appropriate research curriculum), all else held constant, the latter should have a higher probability of being published in a peer-reviewed journal.

The external collaboration of FEP authors, particularly with individuals from foreign institutions, for whom the imperative for international publication is already a long-standing reality and who are therefore more experienced at the outset in the workings of scientific publications, tends to influence positively the probability for external publication.

Lastly, it is to be expected that that probability for external publication may also be different according to the fields of knowledge and time periods, the latter reflecting in part the level of demand in academic careers and the parameters established in the assessment of institutions.

Thus, I propose that the empirical assessment of the probability of working papers being published externally should be based on the estimation of the following general logistic regression:

$$\begin{aligned}
 P(\text{publ}) = \frac{1}{1 + e^{-Z}}; \text{ com } Z = & \beta_0 + \beta_1 \ln nr\_authors + \beta_2 \ln nr\_pages \\
 & + \beta_3 \text{Category} + \beta_4 \text{Collaboration} \\
 & + \beta_5 \text{Scientific\_area} + \beta_6 \text{Portugal} \\
 & + \beta_7 \text{Period} + \varepsilon_i
 \end{aligned}$$

So as to obtain a more direct reading of the logistic coefficients, the equation of the logistic model should be rearranged, such that the logistic model is rewritten in terms of the odds of the event occurring.

Writing the logistic model in terms of the odds, the *logit* model is obtained:



$$\begin{aligned} \log\left(\frac{\text{Prob}(\text{publ})}{\text{Prob}(\text{notpubl})}\right) &= \beta_0 + \beta_1 \ln nr_{- \text{authors}} + \beta_2 \ln nr_{- \text{pages}} \\ &+ \beta_3 \text{Category} + \beta_4 \text{Colaboration} \\ &+ \beta_5 \text{Scientific}_{- \text{areas}} + \beta_6 \text{Portugal} \\ &+ \beta_7 \text{Period} + \varepsilon_i \end{aligned}$$

The logistic coefficient can be interpreted as a variation of the *log odds* associated with a unitary variation in the independent variable, where  $e$  raised to the power  $\beta_i$  is the factor by which the *odds* are altered when the  $i$ th independent variable increases by a unit. If  $\beta_i$  is positive, this factor will be greater than 1, which means the *odds* have increased; if  $\beta_i$  is negative, the factor will be less than 1, which means that the *odds* have decreased. When  $\beta_i$  is 0, the factor is equal to 1, which leaves the *odds* unchanged.

For example, if the estimate of  $\beta_i$  shows up positive and significant for the conventional levels of statistical significance (that is, 1 per cent, 5 per cent, or 10 per cent), it will mean that, all else held constant, the ratio of the probability of publication to the probability of non-publication increases when the number of WP authors also increases.

The estimates for the  $\beta$ s are presented in Table 1 for the three alternative models which cover the different types of publication. The first model concerns publications in national and international peer-reviewed journals plus publications as chapters in books. The second model includes publications in national and international peer-reviewed journals (excluding chapters in books). The third and final model is only concerned with publications in international peer-reviewed journals. It is to be expected, therefore, given the different degrees of demand among the three types of publication, that the relative importance of the various potential determinants will also be different.

The models present a reasonable level of adjustment. On the one hand, the percentage of correctly attributed estimated observations (between the categories ‘published’ and ‘not published’) is high, varying between 83 per cent and 88 per cent. Furthermore, the Hosmer and Lemeshow test indicates the *non-rejection* of the null hypothesis that the model predicts reality adequately.

TABLE 1. Determinants of the log odds of publication of FEP's working papers, 1985–2005

	National and international journals and chapters in books		National and international journals		International journals	
	$\hat{\beta}$	Exp( $\hat{\beta}$ )	$\hat{\beta}$	Exp( $\hat{\beta}$ )	$\hat{\beta}$	Exp( $\hat{\beta}$ )
<b>Characteristics of article</b>						
Number of authors (ln)	-1.772*	0.170	-1.453	0.234	-1.815	0.163
Number of pages (ln)	-0.869	0.419	-0.643	0.526	-0.296	0.744
<b>Professional category of FEP author(s)</b>						
Masters or PhD student(s) or visiting lecturer(s)	-3.192 <sup>†</sup>	0.041	-2.951 <sup>‡</sup>	0.052	-2.953 <sup>†</sup>	0.052
Assistant lecturer(s)	0.636	1.889	0.258	1.294	0.461	1.585
Assistant lecturer(s) and assistant professor(s) or assistant lecturer(s) and associate professor(s)	4.348 <sup>‡</sup>	77.354	3.381 <sup>‡</sup>	29.413	3.849 <sup>‡</sup>	46.928
<b>Collaboration with external authors</b>						
Co-author from a foreign institution	2.927 <sup>‡</sup>	18.665	2.530 <sup>‡</sup>	12.558	3.347 <sup>‡</sup>	28.426
Co-author from another Portuguese institution	0.735	2.085	0.855	2.352	1.259	3.521
<b>Scientific areas</b>						
Mathematical and quantitative methods	-0.876	0.416	-0.423	0.655	-0.321	0.725
Microeconomics	1.121	3.069	1.167	3.212	1.230	3.420
Macroeconomics and international economics	1.778*	5.917	0.935	2.546	1.359	3.891
Financial economics	0.664	1.942	0.586	1.797	1.088	2.967
Health, education and labour economics	1.918*	6.804	1.661	5.265	1.416	4.119
Industrial organization	-0.799	0.450	-0.811	0.444	0.376	1.457
Business administration and business economics, marketing, accounting	-20.512	0.000	-20.014	0.000	-19.342	0.000
Development, technological change and growth	1.848*	6.349	0.903	2.468	0.553	1.738
Natural resource economics	0.875	2.398	0.616	1.852	-18.469	0.000
Urban, rural, and regional economics	2.507 <sup>†</sup>	12.268	1.946*	6.998	2.517*	12.388
<b>Focus on Portugal</b>	1.076*	2.932	0.879	2.408	0.194	1.214
<b>Time period</b>						
WP produced between 2000 and 2005	1.877 <sup>‡</sup>	6.535	1.082 <sup>†</sup>	2.951	2.102 <sup>‡</sup>	8.185
<b>Constant</b>	-1.490	0.225	-1.364	0.256	-3.750	0.024
<b>Observations</b>						
N	197	197	197			
Published	48	41	26			
Not published	149	156	171			
<b>Quality of adjustment</b>						
Per cent correct	84.8	82.7	88.3			
Nagelkerke R2	0.429	0.327	0.386			
Hosmer and Lemeshow Test	6.856 (sig = 0.552)	7.661 (sig = 0.467)	4.515 (sig = 0.808)			

\* Significant at 10 per cent; <sup>†</sup>significant at 5 per cent; <sup>‡</sup>significant at 1 per cent

All the remaining factors being constant, the odds of publication are twenty-nine times (for national and international journals) to seventy-seven times (for national and international journals and chapters in books) higher when the research associated with the WP results from a co-authorship among assistant lecturers and either assistant or associate professors, than when it results from a sole authorship by an assistant or associate professor or from a co-authorship from among these two groups. This situation seems to be closely linked to the fact that a significant part of the working papers produced by the latter groups have resulted from master's and, especially, PhD projects: 44.2 per cent of the working papers produced between 1985 and 2005 were part of master's and PhD projects. Of the twenty-six working papers published in international peer-reviewed journals, 54 per cent were of this type.

Co-authorship with a researcher from a foreign institution increases significantly the probability of a WP being published, especially in international journals: in this case, the odds of publication are thirty times higher compared to if all the authors are exclusively from FEP. The number of pages and authors does not seem to influence significantly the probability of publication, especially at the level of journals (international or national). A focus on Portuguese issues only appears relevant with regard to the probability of overall publication (i.e., including chapters in books) and is not therefore a critical variable for publication in peer-reviewed journals. WPs in the area of 'urban, rural, and regional economics' have a significantly higher probability of being published in peer-reviewed journals than WPs in other areas. Compared to the area used as a default term of comparison—'history of economic thought, methodology, and heterodox approaches,' *ceteris paribus*, the other scientific areas, excluding 'urban, rural, and regional economics,' do not appear to have a significantly higher probability of publication in journals, whether national or international. However, if the publication of WPs as chapters in books is accounted for, areas like 'macroeconomics and monetary economics,' 'international economics,' 'health, education, and welfare,' 'labor and demographic economics,' and 'economic development, technological change, and growth' have significantly higher odds of publication.

Finally, all else held constant, a recent WP (i.e., produced between 2000 and 2005) has a significantly higher probability of being published than a WP written in the prior period, especially in an international peer-reviewed journal.

## 6. CONCLUSIONS

Besides enabling the discussion of the work carried out by researchers, working papers seem to constitute an important contributor to not only successful scientific research (i.e., articles published in international peer-reviewed journals) but also the scientific performance of academic institutions. However, there are few studies that focus on the factors that influence the publication of working papers in peer-reviewed journals.

In this article, I have analysed the evolution of FEP's working papers in a qualitative and quantitative way, seeking to assess the determinants of the probability of publication.

Through an examination of FEP's 197 working papers that were written over a twenty-year period (1985–2005), it has been determined that, despite the significant difference between the total number of working papers from FEP's faculty and those from the Faculty of Economics at the Universidade Nova de Lisboa (FE/UNL)—which had 475 working papers by the end of 2005—the most recent trend shows that FEP is much more dynamic, producing an average of thirty-four working papers per year, while FE/UNL registers an average of eighteen. In terms of the number of publications per doctorate-holder, it is clear that FEP is much more dynamic, as it produces 0.27 working papers per doctorate-holder (professor) compared to 0.20 from FE/UNL.<sup>20</sup> However, this rate is quite inferior compared to what was produced in the same period by the School of Economics and Management at the University of Minho (EEG/UM).

The rate of publication (both national and international) of FEP's working papers over the last several years was quite high: By the end of 2005, 60 per cent of the working papers written in 2003 had been published in international peer-reviewed journals (as reported in EconLit and others indexes). The dynamics registered in the next year (2004) are also worth mentioning: Almost half of the working papers were published either in scientific peer-reviewed journals or book chapters (both national and international).

It has also been determined that between 1985 and 2005, an average of 13.2 per cent of FEP's working papers were published in international peer-reviewed journals, while 20.8 per cent were published in either international or national peer-reviewed journals, and 24.4 per cent were published in international or national peer-reviewed journals or in book chapters.

Taking the estimation of a *logit* model into consideration, I have concluded that a recent working paper (i.e., one written between 2000 and 2005) in the area of regional and urban economics, co-written with a researcher affiliated with a foreign institution and involving assistant lecturers and professors (assistant and/or associate) has the highest probability of appearing in an international publication.

One of the most robust and interesting findings, which reflects a stylized fact within scientific research all over the world—that is, the tremendous growth of collaboration among researchers and research institutions—is that WPs that have at least one co-author from a foreign institution have a significantly higher probability of being published, especially in international peer-reviewed journals. The odds of publication are thirty times higher for articles with at least one foreign co-author than for those authored by entirely by domestic researchers. This fact shows that countries from the scientific periphery—such as Portugal—with low-profile research institutions like FEP have a need for international scientific collaboration, which is a major aid in scientific upgrading and inclusion in international scientific networks. This requires not only committed and internationally networked domestic researchers but also (and most importantly) adequate and targeted science policy initiatives at the national level that foster international networks in science.

AURORA A. C. TEIXEIRA was awarded a PhD in science and technology policy from the University of Sussex (UK). She is associate professor with Agregação (Habilitation) at FEP (Universidade Porto) and researcher at CEF.UP (Center in Economics and Finance), INESC-Porto (Institute for Systems and Computer Engineering of Porto), OBEGEF (Observatory in Economics and Management of Fraud), and University Technology Enterprise Network (University of Texas at Austin, USA).

#### NOTES

1. A. A. C. Teixeira, 'Mapping the (In)visible College(s) in the Field of Entrepreneurship', *Scientometrics* 89, 1 (October 2011): 1–36
2. M. C. Silva and A. A. C. Teixeira, 'A Bibliometric Account of the Evolution of EE in the Last Two Decades. Is Ecological Economics (Becoming) a Post-normal Science?' *Ecological Economics* 70, 5 (March 2011): 849–62
3. M. Conroy and R. Dusansky, 'The Productivity of Economics Departments in the U.S.: Publications in the Core Journals,' *Journal of Economic Literature* 33, 4

- (December 2005): 1966–71; L. Scott and P. Mitias, ‘Trends in Rankings of Economics Departments in the U.S.: An Update,’ *Economic Inquiry* 34, 2 (April 1996): 378–400; R. Dusansky and C. J. Vernon, ‘Rankings of U.S. Economics Departments,’ *Journal of Economic Perspectives* 12, 1 (Winter 1998): 157–70; A. R. Cardoso, P. Guimarães, and K. Zimmermann, ‘Comparing the Early Research Performance of PhD Graduates in Labor Economics in Europe and the USA,’ *Scientometrics* 84, 3 (July 2010): 621–37
4. A. Kirman and M. Dahl, ‘Economic Research in Europe,’ *European Economic Review* 38, 3–4 (April 1994): 505–22; T. Coupé, ‘Revealed Performances: Worldwide Rankings of Economists and Economics Departments, 1990–2000,’ *Journal of the European Economic Association* 1 (March 2003): 1309–45; P. Kalaitzidakis, T. P. Mamuneas, and T. Stengos, ‘Rankings of Academic Journals and Institutions in Economics,’ *Journal of the European Economic Association* 1 (March 2003): 1346–66; A. R. Cardoso, P. Guimarães, K. Zimmermann, ‘Trends in Economic Research: An International Perspective,’ *Kyklos* 63, 4 (November 2010): 479–94
  5. J. Mata, ‘A investigação em economia em Portugal: 1980–1994,’ *Economia* 19, 2 (1995): 73–100
  6. P. Guimarães, ‘The State of Portuguese Research in Economics: An Analysis Based on Publications in International Journals,’ *Portuguese Economic Journal* 1 (March 2002): 3–25
  7. A. Brasão and F. Lima, ‘Porquê publicar working papers?: reflexões sobre o processo de produção científica em economia,’ *Revista de Humanidades e Tecnologias* 6/7/8 (2001): 72–6
  8. Brasão and Lima, ‘Porquê publicar working papers?’
  9. Given the time period between the production and publication of papers in economics, I decided to set 2005 as the end of the period under study. See G. Ellison, ‘The Slowdown of the Economics Publishing Process,’ *Journal of Political Economy* 105, 5 (July 2001): 947–93. Ellison determined that in the 1990s the average time between submission and publication of economics articles was more than three years and was increasing.
  10. Of the eight institutions mentioned by Brasão and Lima as having a series of working papers, I opted for public higher-education institutions only (excluding, therefore, the Portuguese Catholic University and Bank of Portugal). I have therefore maintained, as a basis for comparison with FEP, the School of Economics and Management of the University of Minho, because it was determined to have the greatest growth in the production of working papers amongst the institutions that have a relatively recent series of working papers, and the Faculty of Economics of the New University of Lisbon, which, apart from being the

school with the longest-running series of working papers, is also usually taken as a benchmark in the area of economics with regard to the capacity for high-quality scientific production.

11. CETE stands for 'Centro de Estudos de Economia Industrial, do Trabalho e da Empresa' (Research Center in Industrial, Labour, and Managerial Economics). It was a research unit within FEP.
12. Brasão and Lima, 'Porquê publicar working papers?'
13. It should be noted that this analysis takes into account WPs only. Much of the work accomplished and possibly published by FEP's researchers has been left out because it was not previously published as current research. For example, of the seventy-eight papers by FEP researchers published by the end of 2005 and indexed in EconLit, only eight had been previously published as WPs. CETE's Discussion Papers (of which there were twenty-five at the end of 2005) have also been left out.
14. On average, until the end of 2005, the FEP WPs produced in a given year are published by international journals within about two years and by national ones in about a year.
15. L. Vicente, 'O Impacto da Investigação Científica Universitária em Portugal,' *Revista Colóquio/Educação e Sociedade* 2/98 (1998): 227–35
16. The information for each time period on the professional categories and the degrees held by the authors of the WPs was obtained at FEP's human resources office. I thank Lídia Soares, Eugénia Melo, and Helena for the valuable assistance they provided in compiling the information for each author.
17. A. Teixeira and J. Sequeira, 'Determinants of the International Influence of a R&D Organisation: A Bibliometric Approach,' *European Journal of Scientific Research* 53, 3 (2011): 400–30, 415
18. W. H. Greene, *Econometric Analysis* (Prentice Hall: New Jersey 2000)
19. J. Issler and T. Pillar, 'Mensurando a produção científica internacional em economia de pesquisadores e departamentos brasileiros,' *Pesquisa e Planejamento Econômico* 32, 2 (August 2002): 323–80
20. Expressed in terms of the number of publications per professor (regardless of accreditation), these two institutions are equal, at 0.15 publications per professor.

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