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Research Productivity in Business Economics: An Investigation of Austrian, German and Swiss Universities

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Abstract. *We draw on a new and comprehensive dataset that collects the research output of business economists employed by Austrian, German and Swiss universities. We compute research rankings of departments and identify the leading departments in selected subdisciplines. Moreover, we investigate how institutional design and individual characteristics affect research productivity and draw some conclusions for the training of junior scientists.*

JEL classification: *A*10, *A*14, *I*23.

Keywords: Business economics; research rankings; research productivity.

1. INTRODUCTION

The international exposure of economic research in continental Europe has certainly increased over the last two decades. This development has been accompanied by a growing interest in comparative evaluations of research institutions. Most of these evaluations have, however, focused on 'proper' economics (defined as the research program envisaged by classical political economists). Representative studies include Clemenz and Neusser (1991) for Austria, Combes and Linnemer (2001) for France, Guimarães (2002) for Portugal, Dolado *et al*. (2003) and Rodríguez (2006) for Spain, Cainelli *et al*. (2006) for Italy, Hein (2006) for Switzerland, Turnovec (2007) for the Czech Republic, and Rauber and Ursprung (2008a) for Germany. Some momentous ranking studies covering Europe as a whole have been published in a special issue of the *Journal of the European Economic Association* (2003).

The much younger subdiscipline of business economics has yet received very little attention. Clearly, this discipline that deals with the application of economic principles to firms or other management units attracts considerable public, commercial and academic interest – reflected, for example, in the growing number of professorships in business administration and the starting salaries of graduates. However, apart from Fabel and Heße (1999) we are not aware of any studies that evaluate research performance in this field. The above-mentioned ranking studies either do not consider this research at all or it is mingled with publications from the various subdisciplines of economics. However, due to differences in publication and citation cultures, blending across disciplines causes comparability problems.

In our study we therefore focus on research in the field of business economics, which, in our understanding, includes the subdiscipline *management*. We exploit a new and comprehensive dataset on the research output of academics in business economics who are employed at universities in Austria, Germany and (German-speaking) Switzerland. Research in economics and research in business economics are complementary. Lacking a business school tradition, business economics – with only few exceptions – constitutes an integral part of most economics faculties at Austrian, German and Swiss universities. This close relationship indicates that similar standards should be applied when evaluating research performance in economics and business economics.

In particular, it is evident that research success must be measured in terms of publications in journals that adhere to some minimum quality standard. For incentive-compatible performance measurement, it is then further necessary to account for quality differences between journals. By the same token, the evaluation strategy needs to be balanced across economics and business economics. Unfortunately, traditional ranking studies have often been tailored to meet the requirements of 'proper' economic research. Consequently, the publication data of business economists are under-represented and the weighting schemes appear inappropriate. In contrast, our analysis reflects the publication habits in the field of business economics.

The paper is organized as follows. In the next section, we describe our dataset and our measures of research productivity. Instead of including a comprehensive literature survey, we discuss the relevant literature when we report our results in the following sections. In Section 3 we present our department rankings. In Section 4 we analyze institutional effects on research productivity and derive some conclusions concerning the training of junior scientists. The impacts of individual characteristics on research performance are analyzed in Section 5. The final section provides a brief outlook on important issues for future analysis.

2. DATA AND METHODOLOGY

We draw on a dataset collected under the auspices of the Committee for Research Monitoring of the German Economic Association (*Verein für*

Socialpolitik). The dataset is housed by the Thurgau Institute of Economics and funded by the Association and the *Handelsblatt*, a leading German business newspaper. It comprises publication records and personal data of roughly 1,800 scientists in the field of Business Economics and Management who are employed by Austrian, German or (German-speaking) Swiss universities in spring 2008. Most of these researchers are employed by a full university.[1] However, we also include the academic staff of institutions that, by international standards, rather resemble business schools.[2] We focus on individuals who possess a doctor's degree and whose principal occupation is academic research and teaching. Part-time lecturers with a primary non-university employment are not included in the dataset.

Personal data and data on institutional characteristics of the departments are gleaned from the departments' homepages. The publications are collected from the EconLit and WISO databases. WISO indexes a large number of journals that publish articles in German. We account for differences in journal quality by using one of the journal meta-rankings proposed by Schulze *et al*. (2008). Meta-rankings are generated by imputing several journal weighting schemes that cover different but overlapping sets of journals. Specifically, we employ journal weights of the meta-ranking that uses Ritzberger's (2008) classification as the base scheme. Ritzberger calculates journal impact factors according to reciprocal citations for SSCI journals in the categories economics, business, finance, industrial relations, and labor, and for selected statistics journals.

Schulze *et al*. (2008) supplement this classification with additional journals that are not included in the SSCI but are ranked in questionnaire surveys conducted by Bräuninger and Haucap (2001), the German Academic Association for Business Research (VHB) and the Vienna University of Economics and Business Administration (WU Wien). While Bräuninger and Haucap's classification includes many economics journals that publish in German, the VHB and the WU Wien classifications introduce the business economics focus that we need for our analysis. The meta-ranking then classifies 2,825 journals (economics and business administration) by sorting them into six quality groups with group weights ranging from one to six.

Intuitively, it may appear more appropriate to use a meta-ranking that is based on the VHB or the WU Wien classification. However, such meta-rankings

1. From the original list of university departments provided by the German Rectors' Conference (HRK), we exclude departments with less than four full professors in our sample – leaving out the International University Bruchsal, the Jacobs University Bremen, the Technical University Graz, the Universities of Erfurt, Hildesheim, Koblenz-Landau and Salzburg, the Kassel International Management School, the WHL Lahr and the International Graduate School (IHI) Zittau. We further omit the Dresden International University, the Steinbeis College Berlin and the Krems-Donau University because their staffs consist (almost exclusively) of academics from other universities on lecture contracts. Owing to its extreme specialization on health management, we also leave out the Medical University Hannover.
2. The respective schools are legally entitled to award doctor's degrees.

would virtually place all SSCI-listed journals into the top category. In contrast, using Ritzberger's (2008) list as the base scheme induces sufficient variation in the journal weights of the resulting meta-ranking. We admit that this procedure may induce a bias against management journals that have an interdisciplinary perspective. For our specific purpose, however, this feature is rather desirable because the results can be readily compared with the available rankings of economics departments. Such comparisons are interesting because pure business administration departments are the exception in Austria, Germany and Switzerland. The standard institutional set-up is rather a department of economic science that encompasses economics as well as business administration. Academics in business administration are thus regularly subjected to research evaluations that fail to account for disciplinary differences.

To measure research performance, we assign a score pw/n to each publication in the sample where p denotes the number of pages, w is the journal weight and n the number of authors. A researcher's output is then defined as the sum of the scores of all articles written over his or her career. Individual research productivity is defined as output divided by career years. Because the weight of journals in the lowest quality category is one, the individual productivity measure can be interpreted as the average number of standardized pages in journals of the lowest quality category per career year.

We assume that the year in which a scientist is awarded the doctorate marks the beginning of his or her career. In cases where this information is missing, we use an estimate of the first career year: for all researchers whose first career year is known we compute the median time lag between the beginning of the career and the first publication. We then assume that this time lag should also apply to individuals for whom the information about the beginning of the career is missing. Department productivity is defined as the average of the productivities of its individual members. Thus, the department productivity measure can be interpreted as the average annual number of standardized pages in journals of the lowest quality category per department member.

Table 1 illustrates the distribution of the 2,825 journals and of the 20,879 articles in the dataset across the six quality categories. The distribution of the articles is bimodal. To test the hypothesis that this bimodality results from the interference of two distributions – one for top researchers and one for less prolific researchers – we compute the distribution of articles separately (1) for researchers who have achieved at least one publication in a top journal and (2) for researchers without a top publication. The last two columns of Table 1 reveal that individuals of both groups publish more articles in journals with a quality weight of four than in journals with quality weights of three and five. This observation does not support the above hypothesis. The observed bimodality is rather due to the way in which journals are assigned to quality categories. Journals in category four seem to be more popular research outlets for business economists in Austria, Germany and Switzerland.

Table 1 Distribution of journals, publications, scores, authors over journal classifications

Quality weight	% of journals	% of articles	% of output	Average no. of authors per article	% of articles – by authors with at least one top publication	% of articles – by authors without top publication
6	0.50	0.39	3.13	2.14	9.36	0.00
5	0.74	0.38	1.92	2.19	4.28	0.21
4	1.17	0.99	4.47	2.30	8.32	0.67
3	2.09	0.79	2.55	2.03	4.39	0.63
2	4.39	3.17	6.97	2.00	11.33	2.82
1	91.12	94.28	80.95	1.90	62.31	95.66
Number, average	2,825	20,879		1.91		

Table 1 also provides information about the distribution of research output and the average number of authors per article across the six types of outlets. Comparing the distribution of the number of publications with the distribution of total output across quality categories illustrates the effect of the quality-weighting scheme. Most of the articles in our sample are either single (37%) or double authored (41%). The average number of authors appears to increase with journal quality.

One of our objectives is to investigate whether institutional and individual characteristics affect research productivity. Because almost 15% of the academics in our sample did not publish in our sample of journals, we then use Tobit regressions to identify the determinants of productivity. The descriptive statistics of the data used in our regression analyses of average department productivity (in Section 4) and of individual productivity (in Section 5) are detailed in Table A.1.

3. DEPARTMENT RANKINGS

Table A.2 reports department rankings according to research productivity. Table A.2(a) includes only full professors and Table A.2(b) includes full professors and junior staff. The leading department is at the University of Bonn. On average, full professors in Bonn publish the equivalent of almost 30 pages per career year (without co-authors) in journals of the lowest quality category. The departments at the universities of Mannheim and Vienna – respectively at the WHU Koblenz/Vallendar, when accounting for junior staff – are ranked second and third. Adopting a bird's-eye view, we cannot confirm a separation of research and teaching universities in Austria, Germany and Switzerland. This is in stark contrast to the situation in the United States.

Table 2 Rank correlations between productivity rankings using different journal weighting schemes (professors and junior staff)

	Whole sample	Quantile 1 (worst)	Quantile 2	Quantile 3	Quantile 4 (best)
VHB	0.8620	0.8079	0.3870	0.6364	0.4113
WU Wien	0.8012	0.7817	0.2043	0.5844	0.2641
Unweighted	0.8227	0.8827	0.4183	0.4632	0.4078
Combes/Linnemer	0.5549	0.3698	0.1609	0.4826	0.1957
Tinbergen	0.4084	0.2598	0.0960	0.1966	0.3101
No. of observations	89	23	22	22	22

Research output is not concentrated on a select group of departments: the normalized Herfindahl index of 0.0088 (0.0086 for the ranking including junior staff) does not indicate a monopolization of the ‘market for publications’.

To judge the robustness of our results with respect to changes in the journal weighting scheme, Table 2 reports rank correlation coefficients between our ranking displayed in Table A.2(b) and alternative rankings. Two of the alternative rankings are taken from Schulze *et al*. (2008) as well but use the VHB and the WU Wien classification as reference lists. We also compare our ranking with a ranking that uses no journal weights at all. For the whole sample the rank correlation between our preferred ranking and these three rankings is rather high. The rank correlations for the quantile 2–4 subsamples are, however, substantially lower, confirming that productivity differences between departments are relatively small.

There is much more disagreement in ranking departments that exhibit high productivity (quantile 4) than in ranking departments with less prolific members: the publication incidence in high-quality journals is actually only noticeable in good departments. Weightings induce shifts in rankings mainly at the top of the lists. This interpretation is confirmed by the rank correlation between our preferred ranking and the ranking computed with unitary quality weights. Again, the rank correlation is higher for low-productivity departments. Thus, high productivity and high quality are correlated.

Table 2 also displays rank-order correlations *vis-à-vis* productivity rankings based on the journal weighting schemes by Combes and Linnemer (2003) and the Tinbergen Research Institute at the Erasmus University, Rotterdam. Both classifications focus on journals in ‘proper’ economics (EconLit). Hence, they do not account for most business journals that we include in our ranking. The correlations between our preferred ranking and these two rankings are – not surprisingly – significantly lower than the correlations discussed above. This finding indicates that publications in WISO journals that are not listed in EconLit cannot be neglected in a well-balanced ranking for the business economics profession. Although EconLit covers the most important and influential economics journals, business economists very often choose other publication outlets. Only 21% of the publications in our dataset are recorded by EconLit. Restricting the analysis to these journals would thus seriously distort the evaluation of research in business economics.

Rauber and Ursprung (2008a) propose to control for cohort effects if evaluating departments with different age structures. Following their method, we therefore define an individual's cohort by the group of peers who received their doctor's degree up to two years before or after the reference individual. We then order the peers in each cohort according to research productivity and assign the appropriate quantile to each individual. In a last step each department's score is calculated as the mean of the quantile values of its individual members.

Our cohort ranking based on the sample including junior staff is presented in Table A.2(c). The leading department according to this ranking is at the University of Konstanz followed by the departments of the Technical University of Braunschweig and the Ludwig-Maximilians-University München. The rank correlation coefficient between the productivity and the cohort ranking is 0.7983. However, cohort rankings do not use information on the absolute differences of productivities within cohorts. Furthermore, not every additional publication increases the score. Thus, performance measurement using cohort rankings may provide somewhat weaker incentives to publish.

Using the departments' web pages, 1,490 individuals can be assigned to subdisciplines. In Table 3 we report top-five department lists for the subdisciplines 'Financial Markets and Corporate Finance', 'Managerial Accounting', 'Marketing and Sales', 'Organization, Personnel and Strategy'

Table 3 Top-five department by fields of research

Rank	Financial Markets and Corporate Finance	Managerial Accounting	Marketing and Sales	Organization, Personnel, and Strategy	Financial Accounting, Auditing and Taxation
1	Mannheim University	Wien University	Darmstadt TU	Würzburg University	Saarbrücken University
2	Ulm University	Koblenz/ Vallendar WHU	Koblenz-Landau University	Bonn University	Paderborn University
3	Karlsruhe University	Ilmenau TU	Augsburg University	Paderborn University	Köln University
4	Dortmund University	Graz University	Jena University	Köln University	Hannover University
5	Jena University	Bremen University	Mannheim University	Braunschweig TU	Trier University

and ‘Financial Accounting, Auditing and Taxation’. Initially, we identified two more subdisciplines. Yet, we exclude the field ‘Production, Cost Accounting and Industrial Management’ because we are too often unable to differentiate this field from business information systems. We also exclude the subdiscipline ‘Public Enterprise Management’ due to an insufficient number of observations.

Only four departments, the departments of the universities of Jena, Mannheim, Köln and Paderborn, make it into the top-five lists in two subdisciplines. No department can claim more than two top rankings. This observation suggests that business economics research is rather specialized. Or phrased in terms of current German higher education politics, centers of excellence are not concentrated in a small number of locations.

Table A.3 provides a ranking of departments such that research output is assigned to the individual’s original training department – defined either as the department that granted the researcher’s doctor’s degree or *venia legendi* – instead of the department that the researcher is currently affiliated with. Unfortunately, we are unable to obtain information concerning the training department for all individuals in our sample. We only include departments in which at least four professors received their training. Professors who received their doctor’s degree from the Humboldt University in Berlin, the University of Bonn and the University of Hagen are most productive (on average). The Technical University of Vienna, the University of Bonn and the University of Passau awarded the *venia legendi* to the most productive researchers in our sample.

The University of Bonn, which is the top university in terms of current department productivity, also belongs to the most successful training institutions. The other leading training departments do not stand out as high-productivity departments in Table A.2(b). Generally, rank correlations between the rankings based on current affiliations and training institutions are moderate. The rank correlation between the productivity ranking reported in Table A.2(b) and the productivity rankings in Table A.3 is slightly higher when focusing on the doctor’s degree 0.5234 than on the *venia legendi* 0.4799.

According to Davies *et al*. (2008) and Kocher and Sutter (2001), the concentration of research output across universities is higher if the research output is assigned to the department that granted the researcher’s doctor’s degrees than if it assigned to the researcher’s current affiliation. The same holds true for our sample. However, the normalized Herfindahl index is still very low: the respective values are 0.0220 (doctorate) and 0.1835 (*venia legendi*). Interpreting this information with due care suggests that the market for junior business economists is not very concentrated in the German-speaking area. We cannot single out a small group of departments that train the most productive individuals. Thus, it does not appear to be a promising strategy to concentrate recruiting on a few prestigious departments when hiring new faculty.

4. INSTITUTIONAL EFFECTS

In this section we investigate whether institutional characteristics affect the research productivity of entire departments. Research productivity is measured as the average of the productivities of department members including junior staff. Table 4 reports the results of a Tobit regression analysis. We present results for two subsamples. Because the variable 'number of students' is not available for Austrian departments, only German and Swiss departments are considered in subsample 1, while subsample 2 also includes the Austrian departments.[3]

We find that research productivity increases with department size as measured by the number of department members (see Table 4). Using subsample 2 that includes the Austrian departments (see Table 4, column 2),

Table 4 Regression output of Tobit regressions for university sample (professors and junior staff)

Dependent variable: department productivity	(1) Without Austrian departments		(2) All departments	
	Coefficient	Standard error	Coefficient	Standard error
Size	0.1191	0.0549**	0.2095	0.0925**
Size squared	–	–	– 0.0019	0.0010*
No. of non-publishing professors	– 1.6020	0.3993***	– 1.5339	0.3743***
Dummy: economics	1.4983	0.9578	1.7729	0.8472**
No. of students per professor	– 0.0009	0.0029	–	–
Dummy: Switzerland	0.7088	1.8940	1.6192	1.8016
Dummy: Austria	–	–	– 3.2536	1.7379*
Ratio Dr/Prof.	– 0.8193	1.4770	– 1.5035	1.3434
Constant	8.3686	1.0510***	7.4355	1.0942***
No. of observations	79		89	
Pseudo-R^2	0.0427		0.0515	

Notes:
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.

3. For the same reason we must also exclude three German business schools (ESCP-EAP Berlin, Frankfurt School of Finance and Management, and Zeppelin University) from subsample 1.

the effect of department size on productivity is actually positive but diminishing. Only when department size exceeds 55 persons, productivity begins to decline. There are only two departments with such a large faculty: the department of the WU Wien and the department of the University of St. Gallen. This finding is perfectly in line with Cainelli *et al.* (2006), who show that average research output of Italian economics departments is higher in larger departments. The positive correlation between productivity and size may reflect either increasing returns in research production (conceivably due to more peer pressure) or the selection of more successful individuals into larger and potentially more prestigious departments.

Cainelli *et al.* (2006) also report that research output is highly concentrated within Italian economics departments, a result that is confirmed by Australian evidence (see Neri and Rodgers, 2006). According to Cainelli *et al.* (2006), this result reflects the division of labor that allows some individuals to specialize in research while others assume teaching and administrative duties. To investigate this issue, we use the Gini coefficient as a measure for the concentration of research output within departments. The average of the Gini coefficients over all departments is 0.22, indicating that concentration of research within departments is moderate. Specifically, the Gini coefficients in our sample are much lower than the Gini coefficients reported by Neri and Rodgers (2006) for Australian economics departments. Furthermore, we find virtually no correlation between concentration of research output and productivity. Division of labor thus does not necessarily induce better research performance.

Our next estimate shows that productivity is lower in departments with a higher number of non-publishing professors. Whether this confirms the finding of Taylor *et al.* (2006), who claim that researchers with productive peers are more productive themselves, remains questionable: in our computations department productivity is defined as the average over all individual productivities. Thus, this average also includes the unproductive members. We return to this issue in the next section where we analyze the determinants of individual research productivities.

Most programs in business economics and management in Austria, Germany and Switzerland are associated with economics departments. Interdisciplinary collaboration and interdisciplinary competition are likely to have an impact on productivity of business economists. In fact, our estimates show that productivity is higher in departments that also run an economics study program (see Table 4, column 2).

According to Maske *et al.* (2003) and Taylor *et al.* (2006), higher teaching loads and/or more administrative duties reduce research productivity. We attempt to proxy the teaching load by the total number of students who major in business economics and management, economics or a related discipline and divide this number by the number of faculty members. Unfortunately, we were not able to uncover federal statistics on student numbers in Austria. The estimate for the subsample that includes only German and Swiss departments suggests, however, that higher teaching loads in terms of class sizes do not deter research productivity (see Table 4, column 1).

Research grants are provided with the intention to enhance research productivity. Often, past research performance is appreciated and used as a predictor for future research performance. We therefore expect a positive correlation between research grants per capita and department productivity. In 2005 the German CHE Consult (an organization that is specialized on advising institutes of higher education) collected data on research grants per researcher for a large number of German universities (see Berghoff *et al.*, 2006). The respective figures for Austria and Switzerland were released by the Austrian Agency for Quality Assurance and the swissUp project in Basel.[4] Owing to missing observations for some universities in our sample, we do not use this information in our regression analysis. Instead, we only compute the correlation coefficient. The coefficient value is 0.0931, indicating only a weak impact of research grants per capita on department research performance. This observation is in line with results of Arora *et al.* (1998) and Jacob and Lefgren (2007). Their explanation emphasizes that research grants only displace other sources of funding without actually improving total research funding.

According to Combes and Linnemer (2003), total publication output and publication output per capita are higher for German departments than for Swiss departments. The respective figures for Austrian departments are even lower. In contrast, Eichenberger *et al.* (2000) find that, upon controlling for differences in population size, Austrian and Swiss departments exhibit higher research productivities than German departments. Both of these country comparisons consider only articles published within a rather restricted period of time. Eichenberger *et al.* (2000) further focus their analysis on a small subset of journals. We find no significant differences in productivity between German and Swiss departments and significantly lower productivities for Austrian departments (see Table 4).

Finally, our Tobit regression reveals that the share of post-docs in a department does not significantly affect the average department productivity. Mentoring of post-docs does not seem to conflict with the research performance of professors.

5. DETERMINANTS OF INDIVIDUAL RESEARCH PRODUCTIVITY

In this section we investigate the effects of institutional determinants and personal characteristics on individual research productivity. The results of a Tobit regression analysis for two different subsamples consisting of all faculty members (column 1) and of full professors only (column 2) are reported in

4. See http://www.hochschulranking.ac.at and http://www.rankingswissup.ch, respectively.

Table 5 Tobit regressions for individual sample

Dependent variable: individual productivity	(1) All researchers Coefficient	Standard error	(2) Only full professors Coefficient	Standard error
Size	0.2748	0.0546**	0.2829	0.0698**
Size squared	– 0.0025	0.0005**	– 0.0027	0.0007**
No. of non-publishing professors	– 1.3432	0.2082**	– 1.2921	0.2441**
Dummy: economics	2.4063	0.6201**	2.8688	0.7791**
Dummy: Switzerland	0.5649	1.0334	1.5135	1.3429
Dummy: Austria	– 1.1933	1.0625	0.1279	1.5112
Ratio Dr/Prof.	– 1.9402	0.6945**	– 1.7928	0.9664*
Career age	– 0.3304	0.0358**	– 0.3126	0.0391**
Dummy: Prof. PhD	4.5697	2.4948*	4.5878	2.4531*
Dummy: Juniorprofessor	– 2.4386	1.6604	–	–
Dummy: Privatdozent	– 3.6370	1.2039**	–	–
Dummy: Dr	– 7.8833	0.7739**	–	–
Dummy: PhD	– 15.7329	5.5552**	–	–
Dummy: ao. Prof.	– 3.9336	2.1236*	–	–
Dummy: gender (female = 1)	– 4.5103	0.7230**	– 3.5733	1.0868**
Constant	13.1355	1.0461**	12.0470	1.2232**
No. of observations	1,482		870	
Pseudo R^2	0.0236		0.0194	

Notes:
**Significant at the 1% level.
*Significant at the 10% level.

Table 5. Additionally, we use a Hurdle model to analyze the propensity to publish and the productivity given publication incidence separately. We specify the initial binary choice in the first tier of the Hurdle model by a Probit model. For the second tier, rather low productivities of many researchers in our sample suggest the log-transformation of the productivity index. Following Wooldridge (2002, pp. 536–538), we therefore assume a log normal distribution of individual productivities of active researchers and use the OLS estimator for the second tier of the Hurdle model. The results of the Hurdle model are presented in Table A.4. Again, we distinguish two subsamples: the subsample of all faculty members [Table A.4(a)] and the subsample of full professors [Table A.4(b)].

Individual productivity is affected by institutional determinants. Researchers in larger departments are more productive. However, the size effect on individual productivity is non-linear: the coefficient associated with the square of size is significantly negative. The effect reaches its maximum for researchers in departments with about 61 persons. However, we are reluctant to interpret this number as an optimal department size because all departments in our sample except for the departments of the University of St. Gallen and of the WU Wien are smaller – and both, by international standards, resemble business schools. The size effect rather indicates that potential returns to scale in research production are positive but diminishing.

Researchers from departments with a larger share of junior scientists exhibit lower productivity on average. The Hurdle model reveals that this effect is not due to significant differences in the propensity to publish but to a lower productivity of researchers who are publishing. Active post-docs in particular seem to profit from mentoring or from exchange with experienced colleagues. Informal collaboration between professors and post-docs within the same department is likely to be more developed in departments in which the share of post-docs is smaller. In any event, it does not seem to be the case that the research productivity of the senior faculty suffers when the junior faculty is sizable.

Recall from the previous section that productivity is lower in departments with a high number of non-publishing professors. We can now confirm that active researchers with less productive peers are less productive themselves. Taylor *et al.* (2006) suggest that research is valued more strongly, more resources are devoted to research, and opportunities for formal or informal collaboration are better in departments with a larger share of publishing academics. Also, this finding may reflect peer effects. In particular, when recruiting new faculty, superior research productivity may be of minor value or even an impediment if incumbent professors want to control internal research competition. Alternatively, however, the effect may be attributed to a selection bias: highly productive researchers may avoid becoming affiliated with departments with a large share of inactive colleagues.

Members of departments that also run economics study programs are more productive. The Hurdle model reveals that this finding can be attributed mainly to higher productivity of active scientists. Thus, professional exchange and competition with economists are particularly conducive to the productivity of researchers who already have some publication experience.

To account for life cycle effects, we define 'career age' as the number of years since obtaining the doctor's degree. Individual productivity then decreases with career age.[5] Remarkably, we find a negative effect of career age on the propensity to publish for the subsample of full professors [see Table A.4(b)]. Because our estimates are based on aggregated data, professors of a higher career age who had more opportunities to publish than peers with shorter careers are actually less likely to have at least one

5. We tested whether the age effect is non-linear but the coefficients of higher-order polynomials of the variable 'career age' turned out to be insignificant.

journal publication during their whole career. Possibly, this finding is due to a change in publication behavior from books and collective volume articles to journal articles that has taken place in more recent times. For the subsample that also includes junior scientists we identify a positive effect of career age on the propensity to publish. The non-linearity of the effect indicates that it is harder for older scientists to publish their first journal article.

The decrease in the productivity of active researchers is in line with the life cycle hypothesis. For (younger) economists who are employed at German universities, Rauber and Ursprung (2008b) report that publication behavior follows a characteristic life cycle: productivity increases in the first years of an academic career, reaches a peak six to eight years after the onset of the academic career and begins to decline afterwards. Explanations of the decline in productivity of tenured professors include the lack of career incentives, the increased obsolescence of knowledge and an increased preference for non-research activities.

We also include dummies for an individual's highest academic degree in our regressions. The negative dummy coefficients for young researchers (see Table 5) indicate a lower productivity compared with full professors. With the exception of so-called 'Juniorprofessoren' and 'Privatdozenten' (staff without and with *venia legendi*, both non-tenured), lower productivity is at least partly due to a smaller propensity to publish [see Table A.4(a)]. Because careers of younger scientists are shorter and many journals exhibit considerable publication lags they simply have had fewer opportunities to publish than professors. 'Juniorprofessoren' and 'Privatdozenten' still need to pass a rigorous competitive assessment on the basis of their publication record when applying for a full professorship. Their propensity to publish does not significantly differ from full professors.

Within the group of active researchers, non-professors are *ceteris paribus* less productive [see Table A.4(a), column 2]. However, finding lower productivities for non-professors who are of the same career age as full professors is not surprising. It only shows that promotions are actually at least partly granted on the basis of an assessment of past research success. To compare the productivities of active young researchers and full professors, we have to account for the fact that the careers of junior researchers are shorter than the careers of full professors. Comparing productivities of median aged junior researchers and median aged full professors, the junior scientists exhibit a higher productivity.

Although we do not know the country in which the academic training took place, we attempt to address the effect of having obtained academic training outside of the German-speaking region. Until very recently the short form for the doctor's degree awarded by Austrian, German and Swiss universities was 'Dr'. Thus, it is likely that individuals whose homepages report a 'PhD' degree have received their academic training abroad. Comparing full professors only (see Table 5, column 2), those who obtained a 'PhD' degree are more productive than researchers holding a 'Dr' degree. In his study on Portuguese economists, Guimarães (2002) reports that there are no significant differences in the propensity to publish in international journals between scientists who obtained their doctorate in Portugal and scientists who received their academic training abroad. There is one notable exception: academics who obtained their PhD in the United States are more likely to publish in international journals than their peers. This finding may either reflect better training, an advantage of US-based departments in the competition for top junior researchers, or the cultivation of a home bias of US-based top journals (see e.g. Hodgson and Rothman, 1999; Kocher and Sutter, 2001).

Finally, we find evidence for gender differences in the publication behavior. Female business economists appear less productive than their male peers. Such differences have also been reported for 'proper' economics research (see e.g. Maske *et al.*, 2003; Rauber and Ursprung, 2008b; Taylor *et al.*, 2006). Rauber and Ursprung (2008b) show that female researchers are less likely to publish but that women who publish are just as productive as their male peers. In contrast, our Hurdle model reveals that active women exhibit a lower productivity than men. Moreover, we actually find no significant differences in the propensity to publish between male and female professors. When using cross-sectional data, lower research output during career interruptions (e.g. during maternity leaves) implies lower overall productivity. In contrast, such events are likely to affect only the publication propensity in the years on leave when using panel data. Hence, there may be a rather simple explanation for the difference between our result and Rauber and Ursprung (2008b).

6. OUTLOOK

Drawing on a new comprehensive dataset that collects the research output of roughly 1,800 business economists working at Austrian, German and Swiss universities, we provide research rankings of university departments and analyze the determinants of research performance. We find that individual research productivity – and consequently departmental research productivity – is affected by institutional and personal characteristics. Most of our findings appear to be in line with previous findings from studies on 'proper' economics that exist for various countries. A direct comparison of research performance between the disciplines economics and business economics would certainly be promising – and possible, given the new data.

Another issue that may be addressed in the future is the problem of adequately accounting for interdisciplinary research. It remains to be tested, for instance, whether the gender differences with regard to publication performance are due to restrictions imposed by the publication data. Women's choices of study programs are known to be biased toward the arts and cultural studies (see BMFSFJ, 2005). Consequently, female academics in business economics and management may tend to specialize on interdisciplinary research that is certainly underrepresented in our publication data. Also, business school-type universities may be underrated in our ranking because both teaching and research may have a more interdisciplinary orientation than research undertaken at full universities in which economic science departments offer joint study programs in economics and business administration. Further, because business school-type institutions specialize in supplying a broad and basic business education, teaching possibly obtains greater relative importance and staff may be more specialized on this task than in 'full' universities.

These open issues are clearly just as important for evaluations of research in 'proper' economics and in (business) economic disciplines that engage in developing quantitative research methods. Interdisciplinary research in these fields may be published in science journals that are not included in either EconLit or WISO. In any event, measuring research performance in areas that are inherently interdisciplinary requires the collection of even more comprehensive data and more elaborate evaluation methods. We hope that the German Economic Association's research monitoring group will be able to tackle these issues in the near future.

APPENDIX A

Table A.1 Descriptive statistics

	Without Austrian universities		All universities	
No. of observations	79		89	
	Mean	Standard deviation	Mean	Standard deviation
Sample: university data				
Productivity	9.9065	4.3238	9.5493	4.3185
Dummy: economics	0.6456	0.4814	0.6180	0.4886
Size (no. of faculty members)	16.6582	10.3166	18.2472	13.6242
No. of students per professor	172.8767	166.0015	–	–
No. of non-publishing professors	0.5823	1.2771	0.6180	1.2294
Ratio Dr/Prof.	0.4777	0.3524	0.4840	0.3695
Dummy: Switzerland	0.0633	0.2450	0.0562	0.2316
Dummy: Austria	–	–	0.0787	0.2707

Table A.1 Continued

	All researchers		Only full professors	
No. of observations	1,482		870	
	Mean	Standard deviation	Mean	Standard deviation
Sample: individual data				
Productivity	8.8581	10.4480	10.1363	10.4765
Dummy: economics	0.6815	0.4660	0.6632	0.4729
Size (no. of faculty members)	28.0331	21.6013	24.6035	18.6563
No. of non-publishing professors	0.8516	1.5190	0.8989	1.6883
Ratio Dr/Prof.	0.7318	0.5204	0.6050	0.4624
Dummy: Switzerland	0.0877	0.2830	0.0805	0.2722
Dummy: Austria	0.1619	0.3685	0.1011	0.3017
Career age	14.1754	9.5608	18.8575	9.0384
Dummy: Prof. PhD	0.0115	0.1065	0.0195	0.1385
Dummy: Juniorprofessor	0.0290	0.1679	–	–
Dummy: Privatdozent	0.0587	0.2352	–	–
Dummy: Dr	0.3023	0.4594	–	–
Dummy: PhD	0.0034	0.0580	–	–
Dummy: a.o. Prof.[a]	0.0196	0.1386	–	–
Dummy: gender (female = 1)	0.1808	0.3850	0.1138	0.3177
Dummy: publication	0.9325	0.2509	0.9805	0.1385

Note:
[a] 'a.o.' indicates 'extraordinary professorship', i.e. tenured or non-tenured professorship achieved without undergoing formal application procedures.

Table A.2(a) Productivity ranking of departments (full professors only)

Rank	University	Productivity	Rank	University	Productivity
1	Bonn University	29.70	46	Berlin FU	8.92
2	Mannheim University	19.85	47	Gießen University	8.92
3	Wien University	19.21	48	Wuppertal University	8.90
4	Saarbrücken University	17.51	49	Dresden TU	8.71
5	Koblenz/Vallendar WHU	17.48	50	Hamburg University	8.47
6	Augsburg University	16.49	51	Magdeburg University	8.41
7	Frankfurt/Main University	16.21	52	Berlin TU	8.25
8	Konstanz University	16.20	53	Zürich ETH	8.02
9	Köln University	16.12	54	Oestrich-Winkel EBS	7.79
10	München TU	15.87	55	Mainz University	7.69
11	Braunschweig TU	15.75	56	Oldenburg University	7.67
12	München LMU	15.60	57	Bremen University	7.50
13	Ulm University	15.43	58	Marburg University	7.41
14	Dortmund University	15.30	59	Wien WU	7.38
15	Basel University	14.76	60	Eichstätt KU	7.26

Table A.2(a) Continued

Rank	University	Productivity	Rank	University	Productivity
16	Jena University	14.66	61	Clausthal TU	7.23
17	Aachen RWTH	14.08	62	Siegen University	7.03
18	Würzburg University	13.97	63	München UniBW	6.82
19	Bern University	13.86	64	Hohenheim University	6.81
20	Kiel University	13.72	65	Zeppelin University	6.37
21	Darmstadt TU	13.69	66	Düsseldorf University	6.27
22	Zürich University	13.06	67	Innsbruck University	6.26
23	Regensburg University	12.80	68	Frankfurt School of F&M	6.20
24	Paderborn University	12.76	69	Witten/Herdecke University	6.00
25	Hannover University	12.04	70	Leipzig University	5.68
26	Karlsruhe University	11.96	71	Frankfurt/Oder University	5.59
27	Bamberg University	11.81	72	Bielefeld University	5.28
28	Bochum University	11.71	73	Potsdam University	5.05
29	Kaiserslautern TU	10.99	74	Chemnitz TU	4.93
30	Passau University	10.99	75	Ilmenau TU	4.91
31	Stuttgart University	10.60	76	Cottbus BTU	4.71
32	Münster University	10.30	77	Osnabrück University	4.44
33	Graz University	10.18	78	Rostock University	4.26
34	Erlangen-Nürnberg University	10.05	79	Kassel University	4.15
35	Duisburg-Essen University	9.73	80	Berlin ESCP-EAP	4.03
36	Greifswald University	9.67	81	Hamburg TU	3.93
37	Tübingen University	9.64	82	Bayreuth University	3.44
38	Göttingen University	9.37	83	Linz University	3.38
39	St.Gallen University	9.34	84	Hamburg UniBW	3.29
40	Freiburg University	9.26	85	Halle-Wittenberg University	3.22
41	Hagen FernUni	9.21	86	Flensburg University	2.54
42	Trier University	9.16	87	Freiberg TU	2.41
43	Wien TU	9.01	88	Lüneburg Leuphana University	2.18
44	Berlin HU	8.96			
45	Leipzig HHL	8.95	89	Klagenfurt University	2.06

Table A.2(b) Productivity ranking of departments (professors and junior staff)

Rank	University	Productivity	Rank	University	Productivity
1	Bonn University	24.01	46	Wien TU	8.92
2	Mannheim University	18.86	47	Wuppertal University	8.90
3	Koblenz/Vallendar WHU	17.81	48	St. Gallen University	8.86
4	Köln University	16.64	49	Dresden TU	8.70
5	Saarbrücken University	16.37	50	Berlin TU	8.33
6	Konstanz University	16.03	51	Berlin HU	8.30
7	München TU	15.87	52	Gießen University	8.21

Table A.2(b) Continued

Rank	University	Productivity	Rank	University	Productivity
8	Ilmenau TU	15.76	53	Hamburg University	8.17
9	Braunschweig TU	15.75	54	Magdeburg University	7.70
10	Frankfurt/Main University	15.72	55	Mainz University	7.56
11	Ulm University	15.56	56	Bremen University	7.44
12	München LMU	15.33	57	Marburg University	7.41
13	Basel University	14.76	58	Zürich ETH	7.16
14	Jena University	14.66	59	Siegen University	7.16
15	Wien University	14.21	60	Eichstätt KU	7.14
16	Würzburg University	13.97	61	Innsbruck University	7.11
17	Kiel University	13.72	62	München UniBW	7.11
18	Augsburg University	13.16	63	Graz University	6.87
19	Zürich University	13.06	64	Clausthal TU	6.83
20	Aachen RWTH	12.96	65	Hohenheim University	6.81
21	Chemnitz TU	12.69	66	Frankfurt/Oder University	6.65
22	Darmstadt TU	12.53	67	Oestrich-Winkel EBS	6.62
23	Regensburg University	12.50	68	Osnabrück University	6.37
24	Bern University	12.49	69	Zeppelin University	6.37
25	Dortmund University	12.16	70	Witten/Herdecke University	6.30
26	Karlsruhe University	11.96	71	Düsseldorf University	6.27
27	Bamberg University	11.81	72	Frankfurt School of F&M	6.20
28	Hannover University	11.76	73	Leipzig University	6.14
29	Paderborn University	11.65	74	Berlin ESCP-EAP	5.99
30	Greifswald University	11.59	75	Wien WU	5.91
31	Passau University	10.99	76	Bielefeld University	5.28
32	Tübingen University	10.95	77	Cottbus BTU	4.71
33	Stuttgart University	10.60	78	Potsdam University	4.69
34	Münster University	10.25	79	Kassel University	4.15
35	Berlin FU	10.13	80	Rostock University	3.95
36	Kaiserslautern TU	10.12	81	Hamburg TU	3.93
37	Duisburg-Essen University	9.71	82	Hamburg UniBW	3.72
38	Oldenburg University	9.56	83	Bayreuth University	3.44
39	Erlangen-Nürnberg University	9.32	84	Linz University	3.41
40	Bochum University	9.30	85	Halle-Wittenberg University	3.22
41	Freiburg University	9.26	86	Lüneburg Leuphana University	2.67
42	Hagen FernUni	9.21	87	Flensburg University	2.54
43	Trier University	9.16	88	Freiberg TU	2.41
44	Göttingen University	9.11	89	Klagenfurt University	2.29
45	Leipzig HHL	8.95			

Table A.2(c) Cohort rankings (professors and junior staff)

Rank	University	Average cohort – quantile	Rank	University	Average cohort – quantile
1	Konstanz University	0.84	46	Bochum University	0.60
2	Braunschweig TU	0.83	47	Leipzig HHL	0.59
3	München LMU	0.81	48	Düsseldorf University	0.59
4	München TU	0.80	49	Bremen University	0.59
5	Koblenz/Vallendar WHU	0.79	50	Wuppertal University	0.58
6	Kiel University	0.79	51	Dresden TU	0.57
7	Bonn University	0.78	52	Eichstätt KU	0.57
8	Frankfurt/Main University	0.78	53	Magdeburg University	0.56
9	Basel University	0.77	54	Frankfurt/Oder University	0.56
10	Mannheim University	0.76	55	Karlsruhe University	0.56
11	Regensburg University	0.75	56	St. Gallen University	0.56
12	Freiburg University	0.75	57	Berlin TU	0.55
13	Würzburg University	0.74	58	Chemnitz TU	0.55
14	Köln University	0.74	59	Siegen University	0.53
15	Passau University	0.73	60	Witten/Herdecke University	0.52
16	Ulm University	0.73	61	Zeppelin University	0.52
17	Stuttgart University	0.73	62	Clausthal TU	0.51
18	Dortmund University	0.72	63	Osnabrück University	0.50
19	Berlin FU	0.71	64	Hamburg University	0.50
20	Greifswald University	0.71	65	Leipzig University	0.49
21	Tübingen University	0.70	66	Zürich ETH	0.49
22	Bamberg University	0.70	67	Bielefeld University	0.49
23	Hannover University	0.70	68	Mainz University	0.49
24	Zürich University	0.69	69	Hohenheim University	0.48
25	Kaiserslautern TU	0.69	70	Innsbruck University	0.48
26	Aachen RWTH	0.69	71	Wien TU	0.47
27	Saarbrücken University	0.68	72	Wien WU	0.46
28	Wien University	0.68	73	Berlin ESCP-EAP	0.45
29	Hagen FernUni	0.66	74	Kassel University	0.45
30	Münster University	0.65	75	Potsdam University	0.43
31	Erlangen-Nürnberg University	0.65	76	Hamburg TU	0.43
32	Augsburg University	0.65	77	Oestrich-Winkel EBS	0.43
33	München UniBW	0.64	78	Graz University	0.42
34	Jena University	0.64	79	Bayreuth University	0.40
35	Trier University	0.63	80	Cottbus BTU	0.40
36	Paderborn University	0.63	81	Hamburg UniBW	0.39
37	Oldenburg University	0.63	82	Halle-Wittenberg University	0.38
38	Marburg University	0.62	83	Linz University	0.37
39	Darmstadt TU	0.62	84	Rostock University	0.37

Table A.2(c) Continued

Rank	University	Average cohort – quantile	Rank	University	Average cohort – quantile
40	Bern University	0.61	85	Frankfurt School of F&M	0.32
41	Duisburg-Essen University	0.61	86	Freiberg TU	0.30
42	Göttingen University	0.61	87	Lüneburg Leuphana University	0.28
43	Ilmenau TU	0.61			
44	Berlin HU	0.61	88	Klagenfurt University	0.28
45	Gießen University	0.61	89	Flensburg University	0.27

Table A.3 Productivity rankings according to training location (professors and junior staff)

Rank	University granting doctor's degree	Productivity	Rank	University granting doctor's degree	Productivity
1	Berlin HU	21.10	30	Aachen RWTH	8.04
2	Bonn University	17.37	31	München LMU	7.98
3	Hagen FernUni	16.51	32	Karlsruhe University	7.97
4	Passau University	15.95	33	Magdeburg University	7.42
5	Mannheim University	15.36	34	Innsbruck University	7.41
6	Braunschweig TU	15.16	35	Wien WU	7.35
7	Kiel University	14.03	36	Berlin FU	7.24
8	Koblenz/Vallendar WHU	13.63	37	Duisburg-Essen University	7.14
9	Kaiserslautern TU	12.45	38	Hohenheim University	7.04
10	Saarbrücken University	12.38	39	Zürich University	6.87
11	Dortmund University	12.06	40	Paderborn University	6.86
12	Frankfurt/Main University	11.86	41	Basel University	6.75
13	Oldenburg University	11.74	42	Münster University	6.56
14	Würzburg University	11.48	43	Bochum University	6.41
15	Augsburg University	10.99	44	Erlangen-Nürnberg University	6.29
16	Trier University	10.84	45	Gießen University	6.23
17	St. Gallen University	10.79	46	Graz University	6.18
18	Hannover University	10.76	47	Berlin TU	5.92
19	Bielefeld University	10.70	48	Rostock University	5.55
20	Hamburg University	10.68	49	Bayreuth University	4.78
21	Köln University	10.67	50	Stuttgart University	4.61
22	Wien TU	10.66	51	Linz University	3.63
23	Regensburg University	10.44	52	Bremen University	3.59
24	Marburg University	10.37	53	Bamberg University	3.38
25	Tübingen University	10.14	54	München TU	2.72
26	Freiburg University	9.92	55	Zürich ETH	2.62
27	Wien University	9.73	56	Klagenfurt University	2.19
28	Freiberg TU	8.79	57	Oestrich-Winkel EBS	1.82
29	Göttingen University	8.64			

Table A.3 Continued

Rank	University granting *venia legendi*	Productivity	Rank	University granting *venia legendi*	Productivity
1	Wien TU	25.55	28	Darmstadt TU	9.22
2	Bonn University	22.87	29	Dortmund University	9.07
3	Passau University	17.07	30	Bochum University	8.71
4	Hamburg UniBW	17.05	31	Erlangen-Nürnberg University	8.51
5	Basel University	16.96	32	München LMU	8.37
6	Bielefeld University	16.83	33	Innsbruck University	8.15
7	Koblenz/Vallendar WHU	16.32	34	Wien University	7.93
8	Lüneburg Leuphana University	15.91	35	München TU	7.64
9	Kiel University	15.69	36	Karlsruhe University	7.41
10	Würzburg University	14.98	37	Aachen RWTH	7.40
11	Hamburg University	14.71	38	Stuttgart University	7.23
12	Kaiserslautern TU	14.13	39	Berlin TU	7.18
13	Mannheim University	13.52	40	Wien WU	6.90
14	Saarbrücken University	13.51	41	Münster University	6.69
15	Köln University	13.46	42	Graz University	6.66
16	Berlin HU	12.96	43	Gießen University	6.50
17	Zürich University	12.93	44	Bayreuth University	6.23
18	Frankfurt/Main University	12.17	45	Paderborn University	5.92
19	Regensburg University	11.85	46	Eichstätt KU	5.80
20	Augsburg University	11.42	47	Hannover University	5.53
21	Trier University	10.92	48	Berlin FU	5.23
22	Hohenheim University	10.92	49	Göttingen University	4.43
23	Oldenburg University	10.54	50	Bremen University	3.50
24	Duisburg-Essen University	10.42	51	Oestrich-Winkel EBS	3.21
25	St. Gallen University	10.26	52	Klagenfurt University	3.17
26	Tübingen University	9.30	53	Linz University	2.64
27	Freiburg University	9.27			

Table A.4 Hurdle model: (a) whole sample and (b) only full professors

	(1)		(2)	
	1. Stage: probit		2. Stage: OLS	
Dependent variable	Dummy: publication		Log productivity	
	Coefficient	Standard error	Coefficient	Standard error
(a) Whole sample[a]				
Size	0.0075	0.0041*	0.0235	0.0057***
Size squared	–	–	– 0.0002	0.0001***
No. of non-publishing professors	– 0.1490	0.0358***	– 0.1709	0.0242***

Table A.4 Continued

	(1)		(2)	
	1. Stage: probit		2. Stage: OLS	
Dependent variable	Dummy: publication		Log productivity	
	Coefficient	Standard error	Coefficient	Standard error
Dummy: economics	– 0.1703	0.1417	0.3194	0.0642***
Dummy: Switzerland	– 0.1262	0.2126	0.1545	0.1128
Dummy: Austria	– 0.3255	0.2024	– 0.2461	0.1174**
Ratio Dr/Prof.	– 0.0298	0.1368	– 0.2298	0.0751***
Career age	0.3809	0.0863***	– 0.1643	0.0329***
Career age^2	– 0.0313	0.0095***	0.0064	0.0018***
Career age^3	0.0009	0.0004**	– 0.0001	0.0000***
Career age^4	0.0000	0.0000**	–	–
Dummy: Prof. PhD			0.1395	0.3355
Dummy: Junior professor	– 0.3113	0.3895	– 0.6439	0.1790***
Dummy: Privatdozent	0.0868	0.4176	– 0.4273	0.1189***
Dummy: Dr	– 1.1625	0.2126***	– 1.1225	0.0994***
Dummy: PhD	– 2.5850	0.6380***	– 0.8595	0.1606***
Dummy: a.o. Prof.[b]	– 0.4328	0.4871	– 0.4404	0.2350*
Dummy: gender (female = 1)	– 0.4613	0.1308***	– 0.4659	0.0725***
Constant	1.3155	0.3201***	3.0683	0.1999***
No. of observations	1,482		1,382	
Pseudo-R^2	0.2378		0.2264	
(b) Only full professors[c]				
Size	0.0648	0.0253***	0.0206	0.0073***
Size squared	– 0.0005	0.0002**	– 0.0002	0.0001**
No. of non-publishing professors	– 0.2554	0.0645***	– 0.1512	0.0260***
Dummy: economics	– 0.0917	0.2777	0.3326	0.0780***
Dummy: Switzerland			0.1412	0.1430
Dummy: Austria	– 0.2374	0.3932	– 0.2882	0.1722*
Ratio Dr/Prof.	– 0.1561	0.3485	– 0.1241	0.0996
Career age	– 0.0268	0.0122**	– 0.0408	0.0044***
Dummy: Prof. PhD			0.1889	0.3177
Dummy: gender (female = 1)	– 0.1439	0.3228	– 0.4274	0.1028***
Constant	2.1855	0.3291***	2.3325	0.1272***

Table A.4 Continued

Dependent variable	(1) 1. Stage: probit Dummy: publication		(2) 2. Stage: OLS Log productivity	
	Coefficient	Standard error	Coefficient	Standard error
No. of observations	870		853	
Pseudo-R^2	0.1528		0.1817	

Notes:
***Significant at the 1% level.
**Significant at the 5% level.
*Significant at the 10% level.
Similar results if negative binomial regression is used in the second stage.
[a] All persons with the title Professor PhD published at least one article during their career.
[b] 'a.o.' indicates 'extraordinary professorship', i.e. tenured or non-tenured professorship achieved without undergoing formal application procedures.
[c] All professors from Switzerland and all persons with the title Professor PhD published at least one article during their career.

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REFERENCES

Arora, A., P. A. David and A. Gambardella (1998), 'Reputation and Competence in Publicly Funded Science: Estimating the Effects on Research Group Productivity', *Annales d'Economie et de Statistique* 49–50, 163–198.

Berghoff, S., G. Federkeil, P. Giebisch, C.-D. Hachmeister, M. Hennings and D. Müller-Böling (2006), 'Das CHE ForschungsRanking deutscher Universitäten 2006', Working Paper No. 79, Centrum für Hochschulentwicklung, Gütersloh.

BMFSFJ (2005), 'Gender Datenreport 2005', Bundesministerium für Familie, Senioren, Frauen und Jugend, section 1.7.

Bräuninger, M. and J. Haucap (2001), 'Was Ökonomen lesen und schätzen: Ergebnisse einer Umfrage', *Perspektiven der Wirtschaftspolitik* 2, 185–210.

Cainelli, G., A. de Felice, M. Lamonarca and R. Zoboli (2006), 'The Publications of Italian Economists in ECONLIT: Quantitative Assessment and Implications for Research Evaluation', *Economia Politica* 23, 385–423.

Clemenz, G. and K. Neusser (1991), 'International Impact of Austrian Economists', *Empirica* 18, 201–219.

Combes, P.-P. and L. Linnemer (2001), 'La publication d'articles de recherche en économie en France', *Annales d'Economie et de Statistique* 62, 5–47.

Combes, P.-P. and L. Linnemer (2003), 'Where are the Economists Who Publish? Publication Concentration and Rankings in Europe based on Cumulative Publications', *Journal of the European Economic Association* 1, 1250–1308.

Davies, J. B., M. G. Kocher and M. Sutter (2008), 'Economics Research in Canada: A Long-Run Assessment of Journal Publications', *Canadian Journal of Economics* 41, 22–45.

Dolado, J. J., A. García-Romero and G. Zamarro (2003), 'Publishing Performance in Economics: Spanish Rankings (1990–1999)', *Spanish Economic Review* 5, 85–100.

Eichenberger, R., U. Meier and R. Arpagaus (2000), 'Ökonomen, Publikationen und Zitationen: Ein europäischer Vergleich', *Perspektiven der Wirtschaftspolitik* 1, 143–160.

European Economic Association (2003), 'Symposium on Evaluating Economics Research in Europe', *Journal of the European Economic Association* 1, 1239–1423.

Fabel, O. and F. Heße (1999), 'Befragungsstudie vs. Publikationsanalyse: Zur Interpretation von Ranglisten der Forschungsaktivitäten deutscher betriebswirtschaftlicher Fachbereiche', *Die Betriebswirtschaft* 59, 196–204.

Guimarães, P. (2002), 'The State of Portuguese Research in Economics: An Analysis based on Publications in International Journals', *Portuguese Economic Journal* 1, 3–25.

Hein, M. (2006), 'How Did Economic Research in Switzerland Develop since the Beginning 90s?', *Schweizerische Zeitschrift für Volkswirtschaft und Statistik – Economic Journal of Economics and Statistics* 142, 285–306.

Hodgson, G. M. and H. Rothman (1999), 'The Editors and Authors of Economics Journals. A Case of Institutional Oligopoly?', *Economic Journal* 109, 165–186.

Jacob, B. and L. Lefgren (2007), 'The Impact of Research Grant Funding on Scientific Productivity', NBER Working Paper No. 13519.

Kocher, M. G. and M. Sutter (2001), 'The Institutional Concentration of Authors in Top Journals of Economics during the Last Two Decades', *Economic Journal* 111, 405–421.

Maske, K. L., G. C. Durden and P. E. Gaynor (2003), 'Determinants of Scholarly Productivity among Male and Female Economists', *Economic Inquiry* 41, 555–564.

Neri, F. and J. R. Rodgers (2006), 'Ranking Australian Economics Departments by Research Productivity', *Economic Record* 82 (Special issue, Suppl. 1), S74–S84.

Rauber, M. and H. W. Ursprung (2008a), 'Evaluation of Researchers: A Life Cycle Analysis of German Academic Economists', in: M. Albert, D. Schmidtchen and S. Voigt (eds.), *Conferences on New Political Economy, Vol. 25, Scientific Competition*, Mohr Siebeck, Tübingen, pp. 101–122.

Rauber, M. and H. W. Ursprung (2008b), 'Life Cycle and Cohort Productivity in Economic Research: The Case of Germany', *German Economic Review*, this issue.
Ritzberger, K. (2008), 'A Ranking of Journals in Economics and Related Fields', *German Economic Review*, this issue.
Rodríguez, D. (2006), 'Publishing Performance of Spanish Academics: 1970–2004', *Spanish Economic Review* 8, 255–270.
Schulze, G. G., S. Warning and C. Wiermann (2008), 'Zeitschriftenrankings für die Wirtschaftswissenschaften – Konstruktion eines umfassenden Metaindexes [Journal Rankings for Economics and Business Administration: Construction of a Comprehensive Meta-Index]', *Perspektiven der Wirtschaftspolitik* 9, 286–305.
Taylor, S. W., B. F. Fender and K. G. Burke (2006), 'Unraveling the Academic Productivity of Economists: The Opportunity Costs of Teaching and Service', *Southern Economic Journal* 72, 846–859.
Turnovec, F. (2007), 'Publication Portfolio of the Czech Economists and Problems of Rankings', *Ekonomický Casopis/Journal of Economics* 55, 623–645.
Wooldridge, J. M. (2002), *Econometric Analysis of Cross Section and Panel Data*, MIT Press, Cambridge, MA.