

Do Birds of a Feather Flock Together? Hiring Patterns of Academic Economists in Germany

Stefan Witte* and Günther G. Schulze**

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Abstract

Does the matching between researchers and departments follow a distinct pattern? We analyze the matching between economists and economics departments in Germany based on their research potential as measured in publication output per career time. The findings suggest that the more prolific a researcher the bigger will be the recruiting department and the more prolific will be his or her colleagues. This result is robust and does not change if we distinguish between the first tenure and later changes.

* Universität des Saarlandes, Lehrstuhl für Wirtschaftspolitik. Email: s.witte@mx.uni-saarland.de. Tel: + 49 681 302 3131.

** Universität Freiburg, Lehrstuhl für internationale Wirtschaftspolitik.

1 Introduction

How does the matching between professors and departments work? Can we identify aspects that make some departments more attractive than others? Germany lends itself to such an analysis because working conditions and income are standardized for public universities while the private sector is too small to actually play a role. We analyze 68 German universities which are all those where at least two economics professors were tenured during the period 1996-2006. The relative research standing of the successful candidates is regressed on the research standing of the department and its size. We find strong evidence for positive assortative matching – it seems that more productive candidates choose and get chosen by more productive and bigger departments.

Analyzing the job market for academic economists in the US, Ault et al. (1979, 1982) furnish an encompassing analysis not only of career determinants for academic economists but also of the determinants for individual productivity. They assume departments to be maximizing output subject to different inputs, i.e. researchers and assistance to them as well as budget constraints. The researchers themselves maximize an objective function consisting of wage, access to editors and program committees as well as training. Dwelling deeper on the research potential, Ault et al. also show that the quality of the graduate school is associated to the quality of the undergraduate institution as well as (notably regional) personal preferences. They show that the quality of the first job is determined by the quality of the training institutions but also the publication index. Later moves depend mainly on publication output, preferences, and (negatively) on whether the new appointment came along with a promotion. While Ault et al. had to rely on quantifying methods which are outdated nowadays and applied OLS regressions to ordered data, their contribution benefits from a large dataset (3813 economists for the period 1955-69) as well as available and accepted rankings on the quality of the institutions.

The German academic system differs from the US system in many ways. Most importantly, there is a relatively large number of research universities (103) out of which we found 68 to employ at least two economists for the period of observation. In Germany, the hierarchy between institutions is less evident than, for example, in the UK or the US. Despite a number of university rankings published by commercial journals as well as by the widely received one by the *Centrum für Hochschulentwicklung* (Centre for Higher Education Development, CHE), the period of 1996 to 2006 has seen few research rankings of economics departments that meet the methodological standards of the scientific community. For 2007, the CHE uses the Web of Science to establish a measure of international visibility but it abstains from weighting or selecting these and presents a simple count of journal articles, review articles and letters (CHE 2008, p. S-9). Considering the wide acceptance of the

Combes and Linnemer (2003) weighting scheme which is also used by the German Committee for Research Monitoring (CRM) (Schneider and Ursprung, 2008) this approach is not up to date. The CHE ranking is too superficial for our purpose. On the other hand, international rankings cover only the top German departments.¹ Recently a German business journal, the *Handelsblatt*, began to publish research rankings of considerable quality (and in collaboration with the CRM). The 2007 version, though not free of shortcomings, largely meets the methodological criteria of academic rankings² and later versions are even better. Unfortunately, these rankings do not cover the period under consideration.

The first ranking in Germany to focus on journal articles and to apply a differentiated weighting scheme was published by Bommer and Ursprung (1998) in review of 57 German economics departments as well as 15 Austrian and Swiss departments.³ They base their analysis on publications in 196 journals indexed in the Social Sciences Citation Index (SSCI). Sternberg and Litzenberger (2003) present a ranking of the twelve largest German economics departments. They furthermore focus on different sub-disciplines of economics, and they more broadly include adjacent disciplines such as political science and sociology as well, rather than to focus exclusively on the discipline of economics. Just as Bommer and Ursprung, Sternberg and Litzenberger find a clear-cut phalanx of economics departments: the universities of Berlin (HU), Bonn, Kiel, Mannheim and Munich (LMU) constitute the leading research universities in economics followed by Bielefeld, Heidelberg and Konstanz.⁴ Rauber and Ursprung (2008a) present a ranking of 52 German economics departments based on different versions of the research potential measure (or human capital approach) where past output is used as a proxy for research potential.

Rauber and Ursprung (2008a) also show the importance of correcting for cohort-specifics. They analyze the output over the life cycle of academic economists, setting up quintiles based on their relative research standing with respect to output over the career and the academic's PhD cohort.⁵ Researchers are classified as *top-*, *accomplished* and *journeymen researchers*, the latter comprising the three lowest quintiles. A researcher's output, as measured in *American Economic Review* (AER) equivalent pages, is best maintained by the top economists. The findings concerning the life cycle of accomplished researchers (the second quintile) and the remaining three quintiles within the profession are less distinct: While the second group displays a hump-shaped pattern with a rather

¹ Ursprung (2003) provides an overview over international rankings as well as a critique of the CHE ranking.

² Zimmer and Ursprung (2007) discuss the 2005 version of the *Handelsblatt* Ranking, Hofmeister and Ursprung (2008) the 2007 version.

³ Bommer and Ursprung also provide an overview over earlier rankings in Germany.

⁴ The departments are listed in alphabetical order, as their respective ranks vary across different rankings and methodologies.

⁵ They assume the career to begin five years before the completion of the PhD and divide the total output by the years elapsed since this date (Rauber and Ursprung, 2006a, p. 12, fn. 12).

strong decline of research output over the life cycle, the third group's pattern is "rather flat and nondescript."⁶ Considering the transition rate, i.e. the probability of moving from one group to another within the period beginning six years after completion of the PhD and ending six years later, Rauber and Ursprung find that most economists do not move out of their group, i.e. their research standing relative to their peers does not change considerably over time. As a researcher's future output can largely be largely assessed by the time of granting tenure, and as tenure decisions have a lasting impact on a department's output, past publication constitutes an important aspect for hiring departments.

Coupé et al. (2006) analyze a sample of 1000 top researchers in economics and test for career determinants and mobility. For their sample they show that productivity and promotion are correlated and that moving to a higher-ranked university is more difficult to achieve and depends on past publication output.⁷ This study is of great importance as it demonstrates sorting according to the relative research standing of academic scientists and of the institutions for which they work. It also shows an important aspect of the academic labor market, namely that learning the ability of an individual academic is a process that does not suffer from asymmetries of information. Research output is publicly observable, such that universities can adequately assess the quality of an applicant and do not suffer information disadvantages compared to the individual or his home institution.

Output of individuals was found to be influenced by incentives, notably the hurdle to become tenured. This was first illustrated by Bell and Seater (1978), who show that productivity is increasing before tenure and decreasing after it. Schlinghoff (2003) analyzes this phenomenon in detail and compares economists and business economists from Germany and the United States. The granting of tenure, constituting the only significant career hurdle in the German system, was found to have a significant and positive impact on publication activity whereas a later, post-tenure transfer from the institution granting tenure to another was not.⁸

The importance of research output for getting tenured in Germany was analyzed by different studies. Graber et al. (2008) provide information on the characteristics of the successful candidates in the tournament for tenure. Based on the set of tenured economics professors in 2005, they show that young researchers publish considerably more than older professors, and while publications become increasingly important, their covariance declines, indicating a general trend toward more journal publications. Heining et al. (2008) also analyze the probability of becoming tenured based on a *curriculum vitae* (CV) analysis of 992 individuals who are either German economics professors or

⁶ Rauber and Ursprung (2008a, p. 111).

⁷ Coupé et al. (2006, pp. 155).

⁸ Schlinghoff (2003, pp. 125).

candidates for such a position. They find that the probability of becoming tenured depends on the publication output as well on the decade in which tenure is granted.⁹ Schulze et al. (2008a) analyze the probability of becoming tenured based on a more complete dataset. They analyze 1734 candidates who received their *Habilitation*¹⁰ between 1985 and 2005 and are thus able to differentiate between successful and non-successful candidates seeking an academic career. Using the WiSo database, a German bibliometric meta-database, they analyze a much broader set of journals for which they present their own meta-ranking based on different journal weightings (Schulze et al. 2008b). In addition to journal publication, their database also includes contributions to collected volumes and books. They find that it is harder for economists to become tenured compared to candidates from business administration and show that youth, marital status as well as publications matter. In addition to journal articles, book publications seem to positively influence the chance to become a professor while fundraising does not.

All of these studies tell in essence the same story: Publications matter for hiring commissions and this aspect is more important today than used to be. The chance of being hired depends on publication output and age. But, one might ask, what about the other side? Do publications also matter for a candidate's choice of a university? Is the quality of potential colleagues' output more relevant than the location of a university or other factors such as the proximity to friends and family? With a clear-cut phalanx of economic research departments and a broad field of distinctively less productive departments, sorting according to research potential is all but evident.

2 Ranking individuals and departments

The question "can you measure research at all?" is a popular criticism to this kind of analysis. The studies described above all rely on the assessment of research based on (mainly) journal publications and, as the contributions on hiring decisions show, the direct impact of publications on reputation and success cannot be rejected. Although hiring committees assess the "match" of candidates with the department based on more than a simple publication score, scientific output plays a major role.

A second concern is that subfields might be disadvantaged for they do not belong to the economic mainstream. Admittedly, economic historians could suffer from this disadvantage just as their colleagues from other subfields who tend to publish books rather than journal articles. For all other cases, the weighting scheme of Combes and Linnemer (2003) as described below provides a balanced basis of comparison as it does not exclusively rely on impact factors but also experts judgments.

⁹ See Schulze et al. (2008a, pp. 475) for a discussion of the contributions from Graber et al. and Heining et al.

¹⁰ The *Habilitation* is a post-doctoral degree and was formerly a quasi-formal prerequisite for becoming a professor in Germany. Schulze et al. (2008a, pp. 477) provide a description of the German academic landscape.

Keeping in mind the different fields, Combes and Linnemer (2003) attributed a weight of at least one half to leading journals of different fields.

It is worth noting that although the publication process is not free of shortcomings, it relies on principles which are very popular amongst economists: the winner-takes-it-all effect induces competition to be the first. It is a widely held view among economists that competition serves as an engine for innovation. Editors of journals themselves have interest in publishing articles of the highest possible quality in order to support the reputation of their outlets. Referees, on their part, do not have any a priori incentives but testing the results for soundness and originality. Economists rely on the market as a mechanism that produces and proceeds considerably more information than any other system because decisions are made in a decentralized manner. Following the same idea, bibliometrics assumes that the struggle for audience (the publication process) and the decisions made by editors and referees on whether or in which form to accept articles for publication produce a large amount of information which can be aggregated in a simple manner. Knowing that an article was “bought” by a good journal (one where many economists want to publish their results in because it reaches a large audience) is a reasonable indicator for the quality of an article.

2.1 Methodology

Scientific quality and productivity has long been measured via an assessment of publications. Fusfeld (1956) ranked American economics departments based the number of papers presented at the annual meetings of the American Economic Association. Later studies followed this path by focusing on articles published in a selection of esteemed journals.¹¹ Publication analysis today builds on the generally accepted quality difference in scientific journals by weighting articles according to the journals in which they are published. However, the choice of the methodology needs some explanation: Only journal articles are considered as they are standard instrument of communicating research results; other forms of publication do not undergo comparable review processes and either precede (working papers) journal articles or, as in the case of monographs, reuse results already published in journal articles.¹² A potential shortcoming of this approach is that article quality varies within journals and citation-based analyses seem more accurate as they assess single articles. Zimmer and Ursprung (2007) however, show that citation analysis is subject to various influences (age, topicality and field of specialization) and manipulation by self-citation and citation cartels; they find publication analysis to be superior. For all these reasons we follow the standard procedure as explained below and apply publication analysis to assess research output.

¹¹ Two very prominent examples are Bell and Seater (1978), or Dusansky and Vernon (1998).

¹² Compare, for example, Neary et al. (2003, p. 1241).

In order to convert a journal article into American Economic Review (AER) equivalent pages, we follow Combes and Linnemer (2003), henceforth referred to as CL. CL allows a very broad analysis as it provides a positive weight for all journal publications listed in the EconLit database. It attributes weights between 1 and 1/12 to every EconLit journal. Five top journals¹³ each receive a weight of 12/12, the next sixteen a weight of 8/12, followed by thirty-nine journals assumed to be half as prestigious as the top journals. The next 68 journals receive a weight of 4/12 and another 138 a weight of 2/12. All remaining EconLit journals are weighted with 1/12.¹⁴

Interpreting CL strictly means to include *all* EconLit publications and to give a weight of 1/12 to every journal that is not given a CL weight higher than 2/12. The minimum weight is given to journals that meet the minimum requirement of EconLit, it therefore provides a partial update of CL by giving a positive weight to articles in journals that have not been listed in EconLit when CL was developed.¹⁵ As Combes and Linnemer base their scheme on the EconLit CD-ROM of 1969-2001¹⁶, such an update appears appropriate.¹⁷

Scores are calculated according to the following equation:

Equation 1

$$SP(T) = \sum_k \frac{p_{k(i)} w_{k(i)}}{n_{k(i)}}$$

The number of standardized pages (*SP*) for a given time span *T* is calculated as the sum of *k* articles each given their length in pages *p*, the CL weight of the journal *w* and divided by the total number of authors *n*.¹⁸

It is important to take all these factors into account. A correction for length matters because articles compete with each other when submitted for the limited space available per issue such that editors will claim text to be shortened if its length is not justified by its content.¹⁹

¹³ These journals are: American Economic Review, Econometrica, Journal of Political Economy, Quarterly Journal of Economics, Review of Economic Studies.

¹⁴ Combes and Linnemer (2003, p. 1255).

¹⁵ As an alternative, the CRM proposes a new list which could be used instead of CL for the time from 2001 on (see Schneider and Ursprung 2008). As we quantify publications from 1969 on, sticking to the CL list appears more appropriate for it is stable over time.

¹⁶ Combes and Linnemer (2003, p. 1259).

¹⁷ It is interesting to note that the publication of Combes and Linnemer itself as well as any article published in the Journal of the European Economic Association would drop out of an analysis based on the original CL list as this journal has only been listed only from March 2003 on (EconLit, 2008).

¹⁸ See Combes and Linnemer (2003, p. 1254) for alternative but less convincing specifications.

¹⁹ Compare Neary et al. (2003, p. 1242).

Some authors take different page sizes into account and control for length by word counts.²⁰ To the best of our knowledge this has never been applied to weightings based on CL. One reason is that standardization would entail high costs. We do not do it for methodological reasons: CL is established in a repetitive process taking into account impact factors as well as corrections for field-specifics.²¹ Citation-based impact factors *automatically* take page sizes into account as longer articles (in words) will receive more citations.

Dividing by the number of coauthors appears rather strict. It has been criticized by e.g. Lubrano et al. (2003), who discount by the square root of n , arguing that dividing by the natural number of coauthors might hamper collaboration and disadvantage small institutions where there is less potential for inside coauthors. However, such an approach creates the incentive for unjustified co-authorships, inflating each participant's output. We follow Hofmeister and Ursprung (2008) who claim that this is the only incentive-compatible way of standardizing articles and establish output-scores based on the equation given above.

A ranking can be based on two different units of assessment, on the university in its entirety, where output is normalized by the size of the faculty or the total number of researchers. In the first case, publications are linked to universities based on the affiliation given in EconLit. For comparability, the output values are normalized by the total number of professors, which is assumed to mirror the total number of scientists.²² This so-called *work-done-at* approach, however, is liable to significant distortions based on EconLit publications of non-economists. It relies on past publication of the department and might not reflect future output, as a substantial part might have been written by scholars who have since left the university. Most problematic is that non-economists publish in EconLit journals and are counted because the affiliation given mostly indicates only the university, not the department. Building departmental rankings on the contributions of scholar which do not belong to the department is an obvious flaw. In an earlier attempt to assess the research standing of German economics department, we applied the *work-done-at* approach to the universities under consideration and found in tests for some institutions that more than 50% of the standardized pages stemmed from non-economists, distorting the ranking in an unpredictable manner. We therefore reject this methodology.

The second version, the so-called *research potential* approach, takes individual's past publications as a proxy for their future output (their research potential). It is based on the output of professors calculated as described above and completely avoids the risk of overstating departments due to

²⁰ Kalaitzidakis (2003) and applying this scheme for Australia, Neri and Rodgers (2006).

²¹ Combes and Linnemer (2003, p. 1255).

²² Bommer and Ursprung (1998) used this approach.

publications from non-economists. On the downside, it neglects all scientists employed by the faculty who are not professors. However, PhD students or post-docs are only temporarily part of a faculty.²³ The research potential ranking has become a standard in the literature and will be applied below to assess the relative standing of departments.

2.2 Data

In order to analyze the whole labor market for academic economists in Germany the analysis includes all German universities where at least two professors were working within the time period 1996-2006.²⁴ Altogether there are 68 universities in the sample. The list of universities is based on the homepage of the German Federal Ministry of Education and Research (BMBF 2007) from which we dropped universities where less than two economics professors work. This list covers more departments than all other available rankings,²⁵ including universities that neither have an economics department nor confer a degree in economics for they are potential employers.²⁶

The dataset contains data on affiliation, output and biographical data for all tenured faculty members for the 68 universities. This list was established in a repetitive internet search based on faculty members lists, data on hiring offers and decisions extracted from *DUZ* and *Forschung & Lehre*, searches in biographical databases, email-correspondence and a guidebook for students planning to study economics (Staufenbiel, 1998). A faculty member list over the period was sent to each department with the request for correction and completion. The lists were sent either to professors that had been working at the department over the entire period or, if these were unavailable or did not respond, to the department deans. The result of this poll was very helpful in some but not in all cases.²⁷ Crosschecking and late responses from some faculties confirmed the correctness of the data.

In total, the dataset contains information on 694 full professors in economics²⁸ affiliated with one of the 68 universities during the period 1996 to 2007. On average, 475 of them were active in a given year. There were 205 moves to one of the faculties in the dataset. Thirty individuals became tenured outside Germany and six transferred to one of the departments within Germany which are not in the

²³ Note that there is no tenure-track in Germany, on the contrary: scholars finishing their Habilitation are allowed to become tenured at their home institution only after working for another institution for a certain period.

²⁴ By the time of data collection, this was the maximum period available. We could not reconstruct affiliation data for years earlier than 1996 and publication data was not yet available.

²⁵ Bommer and Ursprung (1998) ranked 57, Rauber and Ursprung (2008a) 52 and the CHE (2007) 45.

²⁶ The name department is therefore an exaggeration in some cases.

²⁷ Great thanks are owed to those whose comments helped in establishing a correct list.

²⁸ Replacement and honorary professors excluded. Junior professors were dropped because so were post-doctoral scholars working on their habilitation.

dataset.²⁹ From the thirty moving abroad, eight went to the United States or the United Kingdom and twenty-two remained in continental Europe (including Switzerland).³⁰ During the period of observation, 208 professors retired and 180 began their first job as professor.

3 Publication Patterns

Table 1

Year	Total population			Publishers			Non-publishers	
	Av. output	SD	No.	Av. output	SD	No.	No.	Share
1996	1.3	3.7	478	5.2	5.8	125	353	73.8%
1997	1.3	3.4	477	4.8	5.3	124	353	74.0%
1998	1.3	3.5	479	4.6	5.4	136	343	71.6%
1999	1.4	3.7	478	4.6	5.5	145	333	69.7%
2000	1.8	5.0	481	5.8	7.5	152	329	68.4%
2001	1.7	4.2	474	5.0	5.9	163	311	65.6%
2002	1.8	4.0	471	5.5	5.4	156	315	66.9%
2003	1.7	3.7	473	4.9	5.0	160	313	66.2%
2004	2.2	5.0	476	5.7	6.7	185	291	61.1%
2005	2.4	5.0	467	5.7	6.3	200	267	57.2%
2006	2.4	5.1	470	5.7	6.5	199	271	57.7%
Mean	1.8	4.2	474.9	5.2	5.9	158.6	316.3	66.6%

Table 1 gives the summary statistics for average annual publication of the economics professors. The first columns gives the average output over the total population of all professors per year, the second section the values for those who actually published in the given year and the last two columns the number and the share of those who did not publish in the given year.³¹ The average EconLit article was written by 1.65 authors and weights 2.9 AER equivalent pages,³² so the average annual output per professor is about one author's share in the average EconLit article. This, however, is only true for the averages including the non-publishers. Those who did publish actually publish significantly more.³³ The share of economists who did publish in a given year grew constantly, so did the average output. The last two columns of Table 1 show that the increase in average output is not due to higher output per person but to a higher share of individuals publishing in EconLit journals.

²⁹ These were HHL Leipzig, Hochschule für Verwaltungswissenschaften Speyer, IU Bremen, TU Braunschweig, Uni Koblenz-Landau and ZU Friedrichshafen.

³⁰ Not all of them left Germany; some were tenured abroad and then came to Germany.

³¹ Remember that to publish, in this case, is restricted to the actual publication of journal articles indexed in EconLit.

³² Based on own computation of all EconLit publications at one of the universities between 1990 and 2007.

³³ This does not mean that some never publish. Of all economics professors tenured at one of the departments in 2006, only thirty-three had never published a single EconLit article, constituting a share of less than 1%.

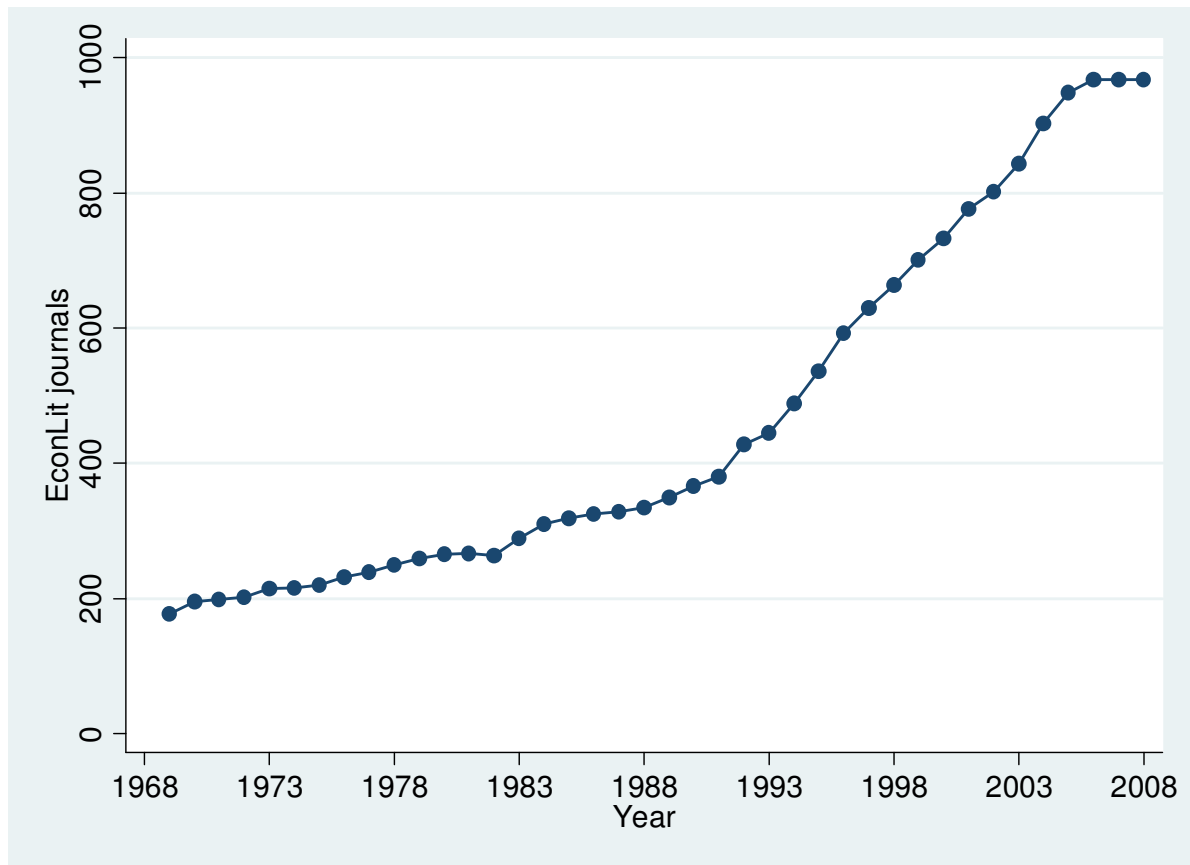
4 Rankings

This observation is in line with Rauber and Ursprung (2008a, b) who showed that there is a significant difference in publication output between scholars of different cohorts: younger publish more than older ones. While we lack data on how many journals there are at all and where economists actually do publish, we follow the popular interpretation of Tom Coupé and assume that EconLit constitutes the body of economics literature.³⁴ This interpretation has some strong assets: leaving the choice of which journal is relevant with those who maintain the database (the American Economic Association) means relying on external expertise. However, this comes at some cost which need to be kept in mind when setting up the rankings or interpreting them.

Figure 1 below shows that the number of journals covered by EconLit grows steadily. This is a big advantage for bibliometric studies as we can base our assessment on a broader set of information. However, the growth might induce false conclusions. The output of German economists also grew steadily, so now we do not know whether this growth is to be explained by differences in habits, training or an increasing internationalization of research or simply by a wider scope of EconLit. Most probably, all three reasons play a role. Rauber and Ursprung acknowledge the problem of a growing number of journals indexed in EconLit and test for a change in publication habit by quantifying the number of citations different outlets receive. They find that the average number of citations which journal articles receive increased which they interpret as a sign for the actually growing importance of journal articles. After correcting for this, they still find the cohort effects to matter – so the problem is confirmed rather than solved. Fortunately, Rauber and Ursprung also propose a solution to the problem which avoids disentangling the growth of EconLit from a change in publication habits: attributing percentile ranks to researchers of the same cohort filters out all kinds of cohort-related specifics.

³⁴ Coupé 2003, p. 1310.

Figure 1



We apply the cohort-correction in order to get reliable rankings for individuals and departments. For each individual, we assume the career to start five years before the completion of the doctorate and normalize output by this career length.³⁵ In a second step, we assign decile ranks to each individual based on the cohort in which the respective professor did his PhD. The cohorts cover time spans of five years starting in 1965.

For the departmental rankings, we assume that not only average research potential but also the size of a department matters. Colleague's research standing can only matter if colleagues matter. The more members there are, the more likely it is that the faculty is renowned, that there are potential good partners for research and, last but not least, the stronger is the political standing within the university.

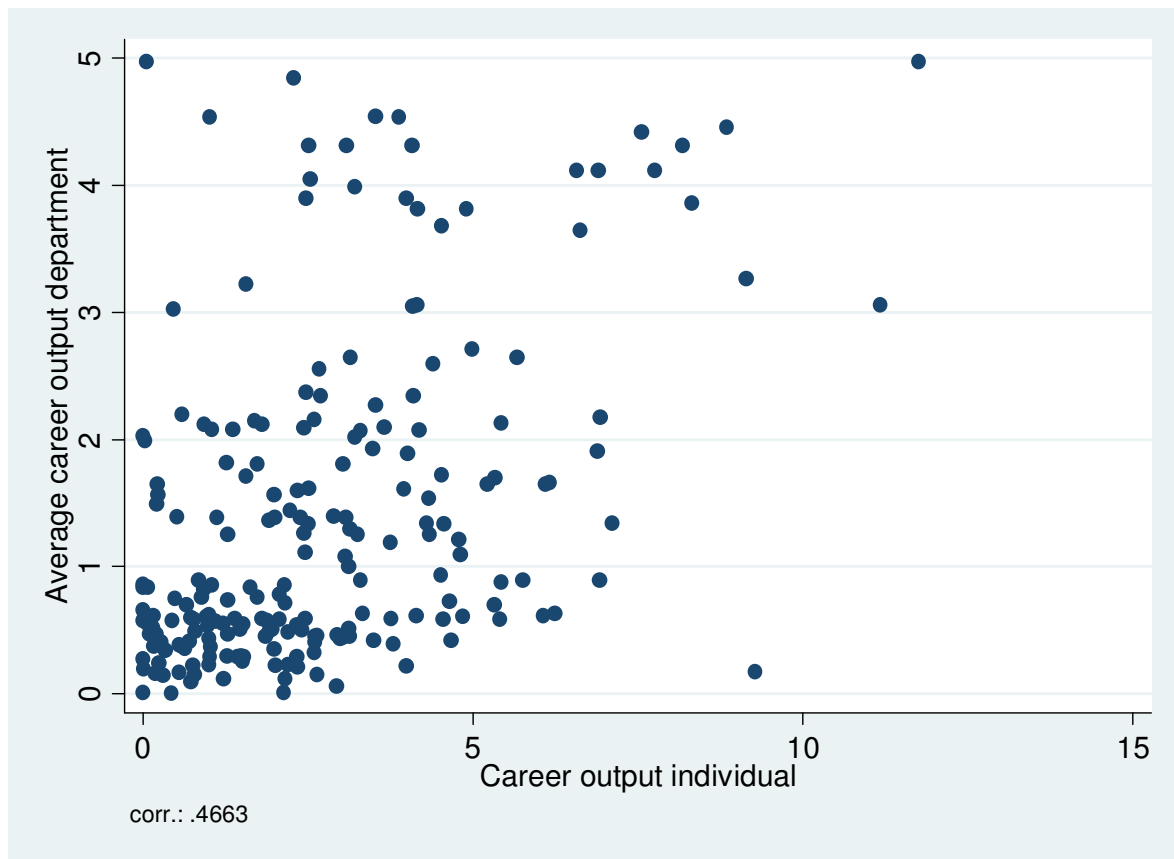
5 Hiring Patterns

Figure 2 shows the scatterplot for the hired candidates and the departments. On the horizontal axis, the average career output per individual is depicted, i.e. the total output of standardized pages

³⁵ Compare Rauber and Ursprung (2008a, b).

divided by the career age. The vertical axis gives the average career output per department lagged for two years.

Figure 2



We can see that there is a positive relationship between both. The correlation coefficient is 0.47. However, concluding that there is positive assortative matching would be too quick. The scatterplot not only neglects cohort-specifics but most importantly the question of who competes with whom. In the next section, we explain how we solved these problems.

6 The Model

Successful candidates are all those candidates that actually begin a job. We thereby neglect those who reject an offer or do not get it in the first place. Note that the job market for academics in Germany is very transparent: vacancies are published in standard outlets (*DUZ*, *Forschung & Lehre*, *ZEIT*) which are well known to all potential candidates such that information asymmetries can be neglected. The market for academic economists is highly competitive: The number of candidates per post (across all economic disciplines *and* business administration) averaged thirty in the period 1997

to 2001.³⁶ This transparency justifies the assumption of a common pool: all candidates *could* apply for all vacancies, given that the vacancy matches their field of specialization. The set of hired candidates is therefore taken as a proxy for the supply side of the market. As we try to identify matching patterns within the successful group, neglecting those who did not move does not alter the interpretation.

The candidates need to be compared to their fellow applicants of the same field; an econometrician will not compete for the same job with a specialist in economic theory.³⁷ Ordinal ranking would seriously err as the groups are of different sizes. Rank 5 in a year of 10 candidates would reflect a completely different relative standing than rank 5 in a year with exactly 5 candidates. We therefore attribute ordinal rankings based on the research standing relative to the peer reference group of scholars hired in the same period. Annual rankings would cut the pool in an arbitrary manner because the job searching process may stretch over several years. The groups of applicants per field and year are rather small, dropping in some years to 1 for econometrics.

Table 2

Variable	Observations	Mean	Std. Dev.	Min	Max
FSRS1cand4	205	2.507317	1.131629	1	4
CSRS (candidates)	205	5.468293	2.670687	1	10
CSRS (departments)	739	5.084935	1.781063	1	9
Professors	739	6.983762	3.511461	2	21

Table 2 gives the summary statistics for the variables used. The first variable measures the *field-specific research standing* (FSRS) of the candidate in four groups. The size of the base group did not justify a finer subdivision. For each year the candidates are pooled according to all applicants in their field of specialization to be hired within a five year period of the year a candidate started a job and the four neighboring years (t-2 to t+2).³⁸ Within these groups, every candidate is assigned a rank ranging from 1 to 4 according to his field-specific relative research standing (FSRScand4). The ranks thus tell whether the candidate belongs to the top 25% (rank 4), to the top 50% (rank 3), etc.³⁹ We define the fields *econometrics*, *economic policy*, *microeconomics*, *macroeconomics*, *public economics* and the residual field *other* which is excluded from the regression.

³⁶ Wissenschaftsrat (2005, p. 90).

³⁷ Rankings of departments could take this aspect in account as well. Assuming a comparable mix of different fields over the different departments, this aspect will be neglected in the rankings used below.

³⁸ The five-year periods are necessary in order to keep the group sizes at reasonable levels. As a robustness check, groups of three years (from t-1 to t+1) were generated – the results remain unchanged.

³⁹ Ranks or, alternatively, cutoff values are a technical prerequisite for an ordered probit analysis which calculates the probability of the dependent variable to reach a certain level.

The FSRS variable is our preferred explanatory variable as it clearly shows the standing of a successful candidate relative to those he or she competed with. However, it cannot take into account the standing relative to all economists, or the cohort, because this would generate too many and too small reference groups. As a robustness check to the field-specific ranking within periods of applicants, the CSRS measures the *cohort-specific research standing* (CSRS) with respect all tenured professors who received their PhD in the same 5-years period. The size of the base group allows attributing decile ranks.⁴⁰ The variable contains information on how good a researcher is in general, not taking into account the competing candidates.

The CSRS measure serves as a robustness check for the field-specific interpretation but also as the base on which we calculate the department rankings. Given the growth of EconLit described above and the findings of Rauber and Ursprung (2008a, b) it is unavoidable to take cohort-effects into account when assessing departmental research standings. We therefore calculate the average CSRS-values by department for every year in order to assess the reputation of the department.

As a second measure for the department, we include the size measured by the total number of tenured professors working at a given department. Assuming decreasing returns to scale, these values are included as a quadratic polynomial.

Due to the ordinal nature of the dependent variable (the standing of the individual researcher relative to the pool of applicants or relative to all other economics professors), an ordered probit model is used. OLS is inapplicable because of the non-linearity of the dependent variable.⁴¹ Other versions of the probit model, an ordinary probit or logit model as well as multinomial probit models would each be insufficient because the dependent variable is naturally ordered.

To avoid endogeneity, the variables for the universities' research standing are lagged for two years. This is important because the quality of the university should not be based on the candidate's contribution (it would include it in the year of appointment). On the other hand, the hiring process takes, on average, two years (Wissenschaftsrat 2005). The two-year lag for the ranking takes into account that the decision of the candidate is explained by the research potential of the university by the time of application.⁴²

As a standard procedure, we include control variables for age and sex in the regression. The age is measured as the age of the researcher, not of his academic life. Here, we want to control for the

⁴⁰ Here, we largely follow the suggestions of Rauber and Ursprung (2008a).

⁴¹ OLS, however, yields comparable results.

⁴² Note that there is one problem which could not be avoided: lagging the variables means to include the predecessor in the explanatory variable. As we did not have data on who was the direct predecessor of hired candidates, we could not take these out of the pool.

difference between a 55-years old and a 35-years old. The variable female is a dummy taking the value one if the hired individual is a woman.

6.1 Results

Table 3

Dependent variable	FSRS	CSRS
uniCSRSavlagged2	0.279 (4.89)**	0.229 (4.26)**
faculty_size	0.367 (3.61)**	0.224 (2.41)*
faculty_size ²	-0.015 (3.24)**	-0.008 (2.02)*
age	-0.055 (3.56)**	0.031 (2.06)*
female	-0.400 (1.05)	-0.433 (1.05)
Observations	177	177
Pseudo R ²	0.1424	0.0944
Robust z statistics in parentheses * significant at 5%; ** significant at 1%		

Table 3 gives the results for our regression. In the first model, the dependent variable is the field-specific research standing (FSRS) which measures how the hired individual compares to those who were hired in the same or a neighboring year. The second model gives the cohort-specific research standing (CSRS). Remember that both variables give quantile ranks, the first one four, the second one ten which turned out to be the best sizes given the reference group.

The first explanatory variable, the average research standing of the department, adjusted for cohort-specifics, is positive and significant at the 1%-level in both models. It is also of a comparable magnitude so this effect can be considered as being robust. The size of the faculty as measured by the number of professors working at the respective department is positive but decreasing, just as expected. In the first model, the impact of size is stronger than in the second model and it seems to be the most important effect of all. Remember that the size measure ranges from 2 to 21 while the measure for the research standing of the department does not get bigger than 9. The control variable age seems to play a role but changes its sign between the two models. This is less surprising than it seems to: the first model does not control for age-specifics and the result suggests that, all other things equal, an older researcher would be hired although his relative research standing is lower. Such a result would not be in line with the expectation that output matters and youth does. Keeping in mind that older researchers publish less in EconLit journals so that we measure less output it seems reasonable to assume that hiring committees know about these changes and – most

importantly – simply do not assess merely EconLit publications. No matter whether the difference is due to a change in habits or measurement problems, this result is in line with the findings of Rauber and Ursprung (2008a, b) without necessarily telling anything about whether age matters. It is rather a corrective. As we can see in the second model where the dependent variable takes into account cohort-specifics, the impact of age seems to be the opposite: other things being equal, the researcher should actually be higher ranked with regards to his or her colleagues in order to get hired by the same institution. Considering that the contributions on hiring success showed a negative impact of age on the probability of getting hired, this result is less surprising. However, the magnitude of the coefficient is rather small and should therefore not be overstated. The sex of the candidate seems not to matter at all. The coefficient is negative but not significantly different from zero.⁴³

Considering that the explanatory power of the first model (the Pseudo-R²) is larger in the first model and the FSRS variable matches our assumptions better, we focus on the field-specific interpretation and distinguish between those who were hired for the first time and those who moved from one university to another one. It is possible that those who are tenured for the first time are much less choosy than those who get their second job.

Table 4

Dependent variable	FSRS (first tenure)	FSRS (move)
uniCSRSavlagged2	0.295 (3.63)**	0.241 (2.95)**
faculty_size	0.341 (2.55)*	0.375 (2.29)*
faculty_size ²	-0.014 (2.36)*	-0.015 (2.02)*
age	-0.074 (2.98)**	-0.057 (2.44)*
female	-0.225 (0.54)	-0.726 (0.77)
Observations	100	77
Pseudo R ²	0.1350	0.1589
Robust z statistics in parentheses * significant at 5%; ** significant at 1%		

Table 4 gives the regressions differentiating between the first job as a professor and later moves. We can see that the results do not change considerably between the two groups. Again, quality and size

⁴³ Note that only about nine percent of the researchers being hired were women.

of the department are major influences, age is still assumed as a corrective and the sex of the candidate plays no role.⁴⁴

7 Conclusion

The analysis indicates that the matching of departments and academic economists in Germany follows a pattern dominated by research potential. The more prolific a candidate, the bigger will be the department where he or she is hired and the more prolific will be its incumbents. This picture does not change if we separate those who get tenured for the first time and those who move later. The results do not contradict the assumption of positive assortative matching.

However, some drawbacks need to be kept in mind: Rankings and the measurement of research output can be criticized for various reasons. The technique of measuring research output, as summarized in equation 1, is common in bibliometric research today, but this does not mean that it is perfect. The analysis does injustice to specialists in fields underrepresented in EconLit or whose research does not lead to regular journal publications. As many statistical measures, quantifying research output is appropriate when it comes to the total population but might be misplaced in individual cases. Problematic is also the neglect of administrative work and teaching. In a study of Australian economists, Fox and Milbourne (1999) found that research output is decreasing with teaching load and administrative burden. We totally neglect administrative work and consulting activities so far.

There is still a number of follow-up questions to be answered: are there other factors determining the matching between economics professors and departments? Reducing the department to size and research standing seems very restricted. How does location or the student body matter and can we find positive assortative matching throughout the population or are these results dominated by extremes at the bottom and at the top? These questions, just as the question of how the matching actually works, have to be left to future research.

⁴⁴ As robustness tests, we ran some alternative regressions including the number of students. As no significant impact could be shown and there were serious doubts about the data quality we do not present these results here.

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