

What (and how long) does take to get tenure ?

## Determinants of hiring decisions for German economics professors

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### **Abstract**

This paper investigates the determinants of tenure decisions in Germany for professorships in economics, business administration and related fields. We show that business candidates have a higher probability to received tenure in each period than teir economics counterparts. Youth, marriage, and publications matter; gender and children do not.

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## 1 Introduction

Tenure decisions are very important for the faculty as well for the individual. For the candidates this true in particular since they come up for tenure at a *relative* late stage of their career at which other attractive alternatives have long ceased to exist. In our sample the successful candidates receive tenure on average at the age of 38 years; the unsuccessful candidates can safely be assumed to stay in academia for a considerable time before they seek other opportunities. For the faculty, of course, it is very important as wrong decisions may have long lasting consequences. In this paper we analyze how faculties make tenure decisions; we seek to establish the determinants for tenure decisions. From our duration analysis we conclude the following recipe for a successful academic career: If you want to maximize the chances of getting tenure you better be young when you receive your Habilitation, married, have published in good journals and be in the business department. If you are a candidate of business you need publish less and your road to tenure is shorter.

The labor market for academics has been widely researched for other countries (e.g. Ehrenberg 2004 Monks and Robinson 2002, Stephan 1996); for German studies however are still scarce. Notable exception include Bommer and Ursprung (1999) and Rauber and Ursprung (2006); yet they study publication profile for German academic economists but not tenure decisions. The only study that looks at tenure decisions in Germany so far is by Schlinghoff (2002). He however looks only at 102 candidates in business who have received their Habilitation between 1990 and 1994, which is hardly representative. Our sample currently covers 526 candidates who received their Habilitation 1985-2005 and it is expected to enlarge considerably over the next weeks.

This is an ongoing project – Our data collection phase is currently still under way. Therefore we present in the paper only preliminary results, but we are confident to have assembled a much more comprehensive data set in two months time. With a more complete data set we will run more sophisticated empirical analyses that include analyses for subperiods and will take into account the number of job openings per period of time.

The paper proceeds as follows. First we briefly outline the institutional setup for tenure decision in Germany, including the role of the Habilitation, then we present our data. In section three we present stylized facts about the structure and profile of candidates for tenure, describe the

distribution of duration until candidates are granted tenure and the share of candidates who receive tenure. In section 4 we present the result of a Cox proportional hazard model for tenure decisions. Section 5 summarizes and concludes.

## 2 The Road to Tenure

The career path to tenure is somewhat different in Germany than in the Anglo-Saxon countries. Thus, a brief remark on the typical career in the German university system seems appropriate. It refers to the situation prior to the introduction of the bachelor/master system which is currently under way. After high school, and possibly military or alternative civilian service (for men), people typically enter the university at the age of 18/19 (women) or 19/20 (men). The median student takes 11.3 semesters to graduate with considerable variation across fields of study. The average graduate is 28.1 years old, but the typical students who commenced their university education after finishing high school or military/ civilian service are 24 to 26 years old.<sup>1</sup> Most people opting to write their PhD dissertation do so directly after receiving their diploma/ magister artium/ state examination; the lion share of people seeking an academic career are employed by a university during that period. They complete their PhD between the age 29 to 32 years. Many people leave the university afterwards, many of whom did not have the intention to pursue an academic career when they started their PhD.

Those seeking an academic career then proceed to write their *Habilitation* thesis, a kind of “Super-PhD” which is typically a much more comprehensive dissertation than the doctoral dissertation. After its successful completion and a Habilitation-colloquium they receive their Habilitation, the qualification for teaching in higher education, and are awarded the academic degree of “*Privatdozent*” at which time people are 39 to 40 years on average (with a wide variation between fields). They then seek job offers for open positions of tenured associate or full professorships at universities different from their home university. This process is very competitive and those who do succeed are 42 years old (averaged over all fields) when they receive their first tenured position. Those who fail often have to accept jobs that require a qualification considerably below their own. The tertiary education sector in Germany consists of three tiers: (1) The universities, includ-

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<sup>1</sup>Data refer to 2002. Statistisches Bundesamt, Fachserie 11, Reihe 4.3.1, 1980-2002, S. 349. Note that those seeking an academic career are considerably faster than the average.

ing pedagogical universities,<sup>2</sup> art academies, and technical universities, (2) technical and other colleges (“Fachhochschulen” who often refer to themselves as “universities of applied sciences”) (3) vocational and technical schools (“Fachschulen”) and universities of cooperative education (“Berufsakademien”) and comparable institutions at each level. Habilitation has been a requirement for tenure only for tier 1 institutions.<sup>3</sup> Tier 2 and 3 institutions and are much more applied in their academic approach and require a PhD and some practical experience outside academia. They constitute a separate market and are not the subject of this analysis.

While a Habilitation has never been a prerequisite for a tenured professorship at a university in a strict sense and could be substituted with a proof of “equivalent scientific achievements” (typically publications of at least equal quality) the introduction of non-tenured junior professorships (assistant professors) have brought an end to the de facto requirement of a Habilitation. Currently we observe a coexistence of independent junior professorships and PhDs opting to write a Habilitation and be part of a research team under the supervision of a tenured professor as the road to tenure. Recently the cumulative Habilitation, a collection of papers, has become popular. It remains to be seen which will be the road most travelled.

The recent developments notwithstanding, the Habilitation has been a de facto requirement for tenure for professors of economics, business administration, and related fields until very recently. Only now are junior professors starting to get tenured jobs. Thus, for our data set, which covers the period 1985 to 2006, the award of the Habilitation marks the entry date of the candidates in the market for tenured professors.<sup>4</sup> The Habilitation goes together with the award of the *venia legendi* which is the university lecture qualification and allows for independent teaching at the awarding university. This *venia legendi* is typically given either for economics or for business administration, but can be defined more narrowly.<sup>5</sup> Unlike in the US, the markets for business professors and economics professors in Germany are rather strictly separated and cross-overs are

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<sup>2</sup>Pädagogische Hochschule, which existed in Thüringen and Sachsen-Anhalt until 1992, in Schleswig-Holstein until 1993, and still exists only in Baden-Württemberg.

<sup>3</sup>Exceptions of the Habilitation requirement are professors in art academies and professors of engineering who often do not have a Habilitation.

<sup>4</sup>To be sure, candidates start looking for tenured professorships earlier and some start applying for jobs even before they have been awarded the Habilitation. We account for that in our data set; but still the Habilitation is a formal prerequisite and thus its award marks the entry in the market in a formal sense.

<sup>5</sup>Related areas are subsumed under economics (such as econometrics and statistics) or business administration (such as information management).

very rare.

### 3 Data

As we want to analyze the individual determinants for getting tenured we need to identify all people who hold a Habilitation in economics, business administration, and related fields and collect data on them. Especially we need to find out whether and when they had received a job offer by a university. Unfortunately, there is no central registry for Habilitations in Germany. We needed to painstakingly assemble a data set on all Habilitations in these fields. First, we searched two professional journals, *Forschung & Lehre*, published by the Deutscher Hochschulverband, the association for professors in German-speaking countries, and *Deutsche Universitätszeitung* which is published by a private publishing house.<sup>6</sup> Both journals have a section in which they report awards of Habilitations by field, including the *venia legendi* and a date as well as official job offers (“Ruf”) issued to professors and candidates seeking their first professorship. Unfortunately it turned out that both journals reported very erroneously and incompletely that we could not rely on the information given. In a second step, we asked first the deans’ offices and then – as this turned out ineffective – friends and trusted colleagues of ours at all German-speaking universities in Germany, Austria, and Switzerland to provide us with a list of people that had been awarded Habilitation at their respective university. This time-consuming procedure resulted in a very high response rate: Only two out of 93 universities did not respond; for those two we had to rely on the information given by *Forschung & Lehre* and the *Deutsche Universitätszeitung*. Given that these were rather small universities, a potential mistake should be very small.

We then searched for the email addresses for all candidates and sent them an online questionnaire asking for personal information such as date of Habilitation, date of first job offer (if at all), date of birth, marital status and number of children at Habilitation, their subarea in economics or business administration, potential academic stays abroad, date and university of their PhD, whether they had handed in a cumulative Habilitation, whether they had raised money for research projects (“Drittmittel”) and some questions relating to attitudes towards academic career.

Parallel to this we searched the *WISO* database which is the most comprehensive German data

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<sup>6</sup>For online versions see <http://www.duz.de> and <http://www.forschung-und-lehre.de/cms/> .

base for literature in economics, business administration and related fields as it comprises not only international publications, but also most comprehensively German language publications.<sup>7</sup>

We classified the following types of publication:

1. Articles in refereed journals (in English or German)
2. Book publications (in English or German)

We did not aggregate over the various types of publication, but we aggregated within each type. Journal articles were weighted by the journals' ranks. We used various rankings as starting points which include the ranking by Combes and Linnemer (2003), Kalaitzidakis et al. (2003), Theoharakis and Axaroglou (2003), the Vienna List, and the VHB list and Bräuning and Haucap (2001). The first three rankings construct impact factors through standard bibliometric procedures and have been used for assessing research output in economics.<sup>8</sup> The Vienna list has been compiled by the Wirtschaftsuniversität Wien and is used to evaluate research output within the university, but also by many other universities.<sup>9</sup> The VHB list has been compiled by the German association of business professors ("Verband der Hochschullehrer"), while Bräuning and Haucap (2001) base their ranking on an online questionnaire among economics and business professors in Germany. The coverage of the journal rankings differs widely - while the first three focus more on economics journals, the Vienna list and the VHB ranking center on business journals. They are all incomplete - no single ranking would have allowed us to adequately assess the scientific output of all people on the job market.

We used the different journal rankings to create various meta indexes: We filled the gaps of one base ranking by regressing the journal ranks of this base ranking on the ranks of all other rankings. Then we used the ranks of all rankings that listed the missing journals and imputed the values for the journals missing in the base ranking with the help of the estimated coefficients in an iterative procedure.<sup>10</sup> The details of the rankings are given in appendix B. Our meta rankings cover 2765 journals; in the following analysis we use two meta rankings, one based on the Vienna list

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<sup>7</sup>For online information on WISO cf. [http://www.bibliothek.uni-regensburg.de/dbinfo/einzeln.phtml?bib\\_id=ubfre&colors=7&ocolors=40&titelid=2173](http://www.bibliothek.uni-regensburg.de/dbinfo/einzeln.phtml?bib_id=ubfre&colors=7&ocolors=40&titelid=2173)

<sup>8</sup>For Germany see Rauber and Ursprung (2006a,b).

<sup>9</sup>It is accessible at <http://bach.wu-wien.ac.at/bachapp/cgi-bin/fides/fides.aspx/fides.aspx?journal=true;lang=DE,26.2.07>

<sup>10</sup>This procedure is similar to Mingers and Harzing (2006).

(VIENNA), the other based on Combes and Linnemer (2003), (COMLI).

Book publishers were ranked only in the Bräuninger and Haucap study, yet the coverage of publishers was very limited. On the basis of their valuations we established similarities and ranked the missing publishing houses accordingly.<sup>11</sup>

## 4 Stylized Facts about Habilitations in Germany

1650 people received a Habilitation in economics, business administration, and related fields during the period from 1985 to 2005. This number is based on the data from *Forschung und Lehre* and *Deutsche Universitätszeitung*, corrected by and amended from the responses of 91 universities. The response from our online questionnaire is still significant below that number since we have not yet investigated all email addresses and not all people contacted have responded to our email yet. This is an ongoing process; due to difficulties of finding correct emails not all people have been contacted yet. Thus the data set should enlarge significantly over the next few weeks. Currently we have data on publications and on personal information from the online questionnaire for 526 people or 31.9 % of the entire population.

We provide some summary statistics on the Habilitations based on the data set of 526 people. 466 people were males, 60 females. The average age at Habilitation was 37.5 years (with a standard deviation of 4.3 years). 57 percent were married, 49.5 percent had at least one kid at the time of their Habilitation, a third of all respondents had small kids (below six years).

511 of 526 respondents stated their field and mostly also their subfield in economics or business administration, which is given below.

54 respondents wrote their Habilitation thesis while working outside academia (external Habilitation), 58 wrote a collection of papers instead of a thesis (cumulative Habilitation).

How successful have candidates been? Of the 237 candidates in business 172 (or 73 %) had already received a job offer and 65 were still waiting for the call to come. 144 (or 65 %) of candidates in economics had been successful already with 77 still awaiting an appropriate offer. In total 182 people (or 34.6 %) of the respondents were still waiting for a job offer. Behind this number is a very heterogeneous group of people, some of whom have just recently completed their Habilitation and

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<sup>11</sup>For example, Bräuninger and Haucap included Oxford University Press, but not Cambridge University Press and we assigned the latter the same value as the former.

Field	subfield	No.	share
Economics		221	43.2 %
	Public Economics	32	
	Economic Policy	44	
	Economic Theory	65	
	Statistics, Econometrics, Mathematics	23	
	Other	26	
Business		237	46.4 %
	Finance and Insurance	26	
	Cost Accounting and Controlling	14	
	Marketing and Trade	19	
	Public Enterprises	6	
	Organization, Personell, Management	42	
	Production, Operations Research, Logistics	29	
	External Accounting, Taxes, Auditing	32	
Other	38		
Business and Economics Education		5	1.0 %
Information Management		27	5.3 %
Industrial Engineering		3	0.6 %
Other fields		18	3.5 %
TOTAL		511	100%

Table 1: Habilitation by field

are on their way to tenure and others who have not been successful in academia and left academia long time ago (some of those may never have sought an academic career). In the next table we show the distribution of time that has elapsed after Habilitation for those that have not (yet) received tenure.

years	Freq.	Percent
1	13	7.1
2	9	5.0
3	12	6.6
4	7	3.9
5	10	5.5
6	15	8.2
7	17	9.3
8	12	6.6
9	11	6.0
>9	76	41.7
TOTAL	182	100

Table 2: Time elapsed since Habilitation for those without job offer

Next we look at the duration until the first tenured professorship is offered for those who got tenure in the end.

years	Economics	Business	Others	Total
< -2	4	3	1	8
-2	0	1	0	1
-1	1	11	1	13
0	20	68	3	91
1	43	44	10	97
2	22	25	6	53
3	18	8	2	28
4	8	7	1	16
5	8	2	0	10
6	12	1	0	13
7	2	1	3	6
8	2	0	1	3
9	2	0	0	2
10	1	1	0	2
12	1	0	0	1
Total	144	172	28	344

Table 3: Duration to tenure (for those who got tenure)

55 percent of all successful candidates got their job offer for a tenured professorship in the year of their Habilitation or the following year. After the third year 85 percent of the success stories have

already been written. There is a distinct difference between business and economics candidates. Successful economists have a much longer road to tenure than business candidates. 74 percent of the successful business candidates receive tenure up to the year after Habilitation while the corresponding figure is only 47 percent for economists.

## 5 Results

We have estimated a Cox proportional hazard model as this allows for significant flexibility. We use time invariant explanatory variables for hazard such as gender, marital status, number of children at time of Habilitation, number of small children age at Habilitation, the category of Habilitation (business, economics, others), whether candidates have written a cumulative Habilitation or an external one, and whether they have raised funds (at least 1000 Euros) prior to their Habilitation.<sup>12</sup> We have included the time varying publication performance as regressors which consists of two indexes for journal articles, and the number of books evaluated with quality weights that were derived from Bräuning and Haucap (see above).

The Results are summarized in the following table

The age at habilitation plays a very significant role. Youth of candidates seem to signal favorable traits to the hiring faculty committees. Likewise, publication performance is a very significant determinant for the probability to receive tenure in any given period of time. Both indexes of journal publications are highly significant with the ranking based on Combes Linnemer performing a little better than the Vienna list. Also quality-weighted book publications matter significantly. We found no evidence for any discrimination of either gender. Being married, however, increases the probability of receiving a job offer significantly. Neither the existence or number of children nor the number or existence of small children seems to play a role for the hazard to get tenure. Surprisingly, external Habilitation do not deteriorate the probability for tenure. Academic stays abroad do not influence the hazard for tenure.<sup>13</sup>

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<sup>12</sup>These data were generated from the online questionnaire; we could not have asked changes in the variable since the Habilitation, as this would have been too cumbersome.

<sup>13</sup>We have created dummies for academic stays abroad of various minimal lengths. The minimum duration did not have an effect – the variable remained insignificant in all specifications.

Variable (3)	(1) (4)	(2)
Female	1.026102 (0.14)	1.038797 (.21)
Age at Habil.	-.9436457*** (-3.45)	- .9324206*** (-4.21)
Married	1.369797** (2.05)	1.357273** (2.9)
Children	.9864 (-0.09)	1.357273 (0.24)
Business	1.97142*** (5.21)	1.537473*** (3.61)
fundraising	1.325139** (2.30)	1.330725** (2.32)
external Habil.	-.7925303 (-1.06)	- .8206505 (-0.91)
Vienna		1.004838* (1.82)
ComLi	1.382973*** (5.45)	
Books	1.031282** (2.48)	1.036117** (2.54)
Abroad	.9464046 (-.25)	.9670385 (-0.15)
	LR chi2(10) = 66.79	LR chi2(10) = 66.79

Table 4: Hazard for Tenure

Variable	no. obs.	Mean	std. dev.	Min.	Max.
Female	522	.1149425	.3192585	0	1
Age at Habil.	506	37.57905	4.353976	27	63
Married	522	.5708812	.4954251	0	1
Children	522	.4846743	.5002445	0	1
Small children (<6 yrs)	522	.3314176	.4711744	0	1
Fundraising	522	.348659	.4770029	0	1
abroad2	522	.9214559	.2692839	0	1
ComLi (at Habil.)	487	.8217864	.9768758	0	9.71
Vienna (at Habil.)	487	11.24612	12.79705	0	128.83
Books (at Habil.)	487	1.682279	2.454378	0	15.72
Duration until tenure	340	1.614706	2.33514	-10	12
Cumulative Habil.	522	.1091954	.3121834	0	1
External habil.	522	.1015326	.3023223	0	1
Economics	522	.4176245	.4936407	0	1
Business	522	.4521073	.4981784	0	1

## 6 Conclusion

The paper has analyzed tenure decisions for candidates for professorships in economics, business administration, and related fields. It turned out that the probability for tenure and the duration until tenure are positively influenced by the publication record both for books and journal articles and negatively by the age at Habilitation. The “hazard” to receive a tenured job offer is significantly larger for people who have raised research funds (Drittmittel), it is larger for married individuals and it takes significantly less time for candidates for business professorships to receive tenure than for economists. The number of children and the gender of the candidate do not play a role, and neither does a research stay abroad or whether the habilitation has been written as collection of papers or as a thesis, and whether it has been written externally.

This paper is only an intermediate result from an ongoing project; we are still receiving data every day. In particular we are currently receiving data on people who left the university after the Habilitation. Those people were especially hard to track. Thus we cannot exclude that in our current results there may be a reporting bias, which however we will be able to reduce significantly in the weeks to come.

## A Summary Statistics

## B Construction of the Journal Ranking

Our journal ranking consists of an overall number of 2765 journals. This is the joint population of the Vienna List ( $n = 1877$ ), the VHB List ( $n = 678$ ), Combes and Linnemer ( $n = 1032$ )<sup>14</sup>, Kalaitzidakis et al. ( $n = 159$ ), Theoharakis ( $n = 100$ ) and Bräuninger and Haucap ( $n = 150$ ).

The following table shows the cross-correlation between the rankings and the number of jointly evaluated journals. With respect to Bräuninger and Haucap we include both the *reputation* and the *relevance* rating. For the VHB rating we use both the index and the rating categories (A+ to E are transformed into the numbers 6 to 1). The same transformation is applied to the Vienna List (A+ to D are changed into the numbers 5 to 1).

	Vienna List	BräuHau Rep.	BräuHau Rel.	Theo. et al.	Kalait. et al.	Comb. Linn.	VHB Index	VHB Rat.
Vienna List	— —							
BräuHau Rep.	0.584 n=118	— —						
BräuHau Rel.	0.335 n=118	0.727 n=150	— —					
Theo. et al.	0.466 n=87	0.809 n=68	0.792 n=68	— —				
Kalait et al.	0.473 n=130	0.745 n=81	0.584 n=81	0.854 n=71	— —			
Comb. and Linn.	0.407 n=326	0.736 n=132	0.464 n=132	0.723 n=99	0.769 n=159	— —		
VHB Index	0.738 n=501	0.668 n=65	0.182 n=65	0.532 n=47	0.575 n=57	0.576 n=136	— —	
VHB Rat.	0.704 n=501	0.675 n=65	0.222 n=65	0.496 n=47	0.525 n=57	0.554 n=136	0.9636 n=678	— —

Table 5: Cross Correlations

As one can see, the overlap between the different rankings is limited. A large fraction of the business administration journals are evaluated by both VHB and the Vienna List. The same holds

<sup>14</sup>Including double counts due to name changes like e.g. the journal *Konjunkturpolitik*, which is now called *Applied Economics Quarterly*

for the rankings which primarily focus on economics journals, i.e. Theoharakis, Kalaitzidakis and Combes and Linnemer. Only the Vienna List comprises a large share of both business administration and economics journals, however there seems to be a bias with respect the more reputable journals, as the rather unimportant journals from both fields are missing. The lower part of the quality distribution can rather be found in the Combes and Linnemer ranking (for Economics) and the VHB list (for Business Administration).

Nevertheless we tried to construct a combined journal ranking, which consists of all journals being ranked in the six ratings. This is necessary for our analysis as we want to make business administrators comparable to economists, circumventing the problem that both groups tend to publish in a different subset of journals. The endeavour seems promising when we look at the cross-correlations between the rankings, which despite the diversity are quite high.

Overall, we construct three different rankings with a complete coverage of all journals, each being established from a different base ranking. Using the Combes and Linnemer ranking as a basis clearly provides the highest accuracy for the economists in our sample. The same holds for the VHB ranking with respect to the business administrators in our dataset. The Vienna List stands in between. The procedure chosen is close to the one employed by Mingers and Harzing (2006). Missing data is imputed using regression analysis. The basic regression equation is<sup>15</sup>

$$\text{Vienna List} = \alpha_1 \text{VHB}_{index} + \alpha_2 \text{ComLim} + \alpha_3 \text{Kalait} + \alpha_4 \text{BrHau}_{rep} + \alpha_5 \text{Theo} + \epsilon. \quad (1)$$

After estimating this equation, we predict all values of the Vienna List, which are missing in the original Vienna List, but non-missing in *all* the explanatory variables.<sup>16</sup> We basically extend the Vienna List by the imputed values and create the new vector *Imputed Vienna List*.

In a next step we regress the Vienna List on all combinations of the subset of four explanatory

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<sup>15</sup>Here we only describe the imputation procedure for the construction of the imputed Vienna List. The process is the same for the imputed Combes and Linnemere ranking and the imputed VHB index.

<sup>16</sup>The regression results are all available upon request from the authors.

variables. The accompanying regressions are

$$\text{Vienna List} = \alpha_1 \text{VHB}_{index} + \alpha_2 \text{ComLim} + \alpha_3 \text{Kalait} + \alpha_4 \text{BrHau}_{rep} + \epsilon \quad (2a)$$

$$\text{Vienna List} = \alpha_1 \text{VHB}_{index} + \alpha_2 \text{ComLim} + \alpha_3 \text{Kalait} + \alpha_4 \text{Theo} + \epsilon \quad (2b)$$

$$\text{Vienna List} = \alpha_1 \text{VHB}_{index} + \alpha_2 \text{ComLim} + \alpha_3 \text{BrHau}_{rep} + \alpha_4 \text{Theo} + \epsilon \quad (2c)$$

$$\text{Vienna List} = \alpha_1 \text{VHB}_{index} + \alpha_2 \text{Kalait} + \alpha_3 \text{BrHau}_{rep} + \alpha_4 \text{Theo} + \epsilon \quad (2d)$$

$$\text{Vienna List} = +\alpha_1 \text{ComLim} + \alpha_2 \text{Kalait} + \alpha_3 \text{BrHau}_{rep} + \alpha_4 \text{Theo} + \epsilon, \quad (2e)$$

where we always predict the missing values in the *Imputed Vienna List*. Note that the number of imputable variables gets larger, the more we restrict the number of explanatory variables. We continue with this process estimating all possible combinations of three explanatory variables, followed by regressions with all combinations of two explanatory variables, and finally by regressing the Vienna List on each single rating separately, just fitting a linear trend. Always imputing the missing data in the Vienna List leaves us with a completely specified *Imputed Vienna List* after a total of 31 regressions. In a last step we round the imputed data to the next integer within the original interval of the Vienna List, i.e. from 1 to 5.

The same method is applied to the vector *Imputed Combes Linnemer*, where we use the Combes and Linnemer ranking as dependent variable in all regressions. Finally, we repeat the whole process with respect to the  $\text{VHB}_{index}$  ranking. We construct the *Imputed VHB<sub>index</sub>* vector, using the  $\text{VHB}_{index}$  ranking as dependent variable in the 31 regressions. Overall, this leaves us with three complete rankings, which are all partially imputed. The original data in each of the three vectors stems from three different ratings, which allows us to make robust analyzes with respect to the publication behaviour across subjects, i.e. business administration and economics.

The descriptive statistics of the imputed rankings and the original rankings can be found in the following table.

	Obs.	Mean	Std. Dev.	Min	Max.
Vienna List	1877	3.14	0.94	1	5
Vienna List Imputed	2765	2.64	1.18	1	5
VHB index	681	6.87	1.55	1.89	9.93
VHB index Imputed	2765	5.21	2.60	0.56	10.16
Combes and Linnemere	1032	0.14	0.14	0.08	1
Combes and Linnemere Imputed	2765	0.18	0.10	0.07	1

Table 6: Descriptive Statistics

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