

## 9 Sample selection bias

Self-selection into the academic labor market might be a potential source of bias in the female coefficient. Since we only observe a sample of those working in academia, we cannot directly control for selection bias by using existing techniques such as the Heckit model. Therefore, in this section we attempt to discuss potential directions of the biases by utilizing statistics of PhD graduates in Japan for the period 1969-2007. MEXT Statistics of School Education (*Gakkou Kihon Chousa*) provide basic statistics of PhD graduates in social sciences<sup>28</sup>.

Figure 2-A summarizes the number of PhD graduates in social sciences over the period 1969-2007. Figure 2-B summarizes the percentage of PhD graduates in social sciences who joined academia over the period 1969-2007<sup>29</sup>. Figure 2-A shows that, until 1990, there was a very small number of females who graduated from PhD programs in social sciences<sup>30</sup> (until 1990, the average numbers of males and females are 184.36 and 8.77, respectively). As for the percentage of graduates hired by universities, the percentage is much higher for males than females until 1990 (average percentages for males and females are 76.8 and 34.0, respectively). However, the percentages appear to converge after the 1990s. The average percentages for males and females after 1990 are 64.76 and 63.55, respectively. The lower number of females joining academia before the 1990s potentially causes sample selection bias in our estimation. If females who potentially faced lower salary in the academic labor market decided not to join academia, then females in the lower tail of the salary distribution are missing from our sample. This could have caused an underestimation of the gender salary gap. Alternatively, employers might have applied stricter hiring criteria for females prior to 1990, which in turn could have led to fewer females joining academia. Therefore, again,

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<sup>28</sup>We do not have data only for those with a degree in economics.

<sup>29</sup>Numbers include those who joined universities. There is no distinction between those who joined four-year and those who joined two-year universities.

<sup>30</sup>The number of female graduates remained small even after 1990, the average numbers of males and females were 201.34 and 61.06, respectively.

females in the lower tail of the salary distribution are potentially missing from our sample, thus, causing underestimation of the gender salary gap. To conclude, although our results provide evidence that females earn about a 7% lower salary than males, this salary gap would be wider if we control for bias due to sample selection.

## 10 Discussions

After controlling for detailed personal, job, institutional, human capital characteristics and rank, we find that female academic economists earn 7% lower salary than comparable males. Estimations of the salary equations reveal that the coefficient for the female dummy is almost the same, regardless of whether rank variables are included or excluded. The ordered logit estimation of the rank equation reveals that there are no gender differences in rank attainment. Therefore, in our sample, there is a sizable gender salary gap *within* each rank, but there are no gender rank attainment differences. Most of the prior studies from the US and the UK found that much of the gender salary difference stems from the fact that female academics are over-represented in the lower ranks, and that there is little salary gap within each rank. Therefore, our results are entirely opposite the patterns of gender salary gaps in the US and the UK.

While, the precise underlying causes for why such a pattern emerges within Japanese economics departments require further investigation, we offer the following two possible explanations. First, such a pattern might be caused by the institutional setting of Japanese universities. In Japanese universities, salary is determined by the personnel division which consists of non-academic staff, while promotion decisions are typically made at the department level by faculty members<sup>31</sup>. Therefore, those determining salaries are likely to have less accurate information about academic productivity. For example, the personnel division

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<sup>31</sup>Exceptions are the academics who are hired and paid from the department budget. Such academics are usually hired on a fixed-term contract and they usually conduct research for a particular project (for example the COE grant funded projects). The effect of this type of contract is captured by the fixed-term dummy.

may not receive the full set of information about academic performance. Moreover, as the personnel divisions consist of non-academics, they may not be capable of assessing some aspects of productivity such as the quality of publications. As Arrow (1973) argues, when performance is difficult to assess, prejudicial beliefs about females' productivity, if these exist, could cause gender salary gap.

Moreover, the problem of noise in performance assessment may be more severe for female academics. For example, because personnel division staff may not be capable of assessing academic performance accurately, information about one's academic productivity transmitted through word-of-mouth may affect the assessment. Since females are relatively new in the academic labor market, lack of social network within the university may prevent females' academic achievement to be properly recognized. As Aigner and Cain (1977) predicts, greater noise in the assessment of females' productivity may cause statistical discrimination against females.

In contrast, promotion may be determined based on more accurate information, since it is decided at the department level, by fellow academics. Since the accuracy of information is a central issue in the theory of statistical discrimination, statistical discrimination or prejudicial beliefs about female academic productivity might have manifested only in terms of gender salary difference in our sample. Thus, the pattern we observe - in which there is a gender salary gap but there is no gender gap in rank attainment - might have been caused by the institutional setting that governs salary and promotion determination.

Second, in Japan, academic salary information is seldom public knowledge. Therefore, gender salary differences in academia have seldom been scrutinized. On the other hand, rank attainment gap, after controlling for productivity, can be more easily detected by fellow academics, since rank attainment is usually public information, at least in the academic community, and information regarding the research output of fellow academics is relatively easy to find. In such circumstances, if taste-based discrimination exists, it is more likely

to manifest as a gender salary gap, where discrimination is hard to detect, than as a rank attainment gap where gender differences can be visible.

Although, we have provided two possible explanations for why salary determination is more discriminatory than promotion decisions within Japanese academia, these explanations do not indicate why promotion decisions are fairer within Japan as opposed to the UK or the US. Here we suggest one possible answer to this question. The lack of gender promotion difference within Japanese academia could be a manifestation of a possible seniority-based promotion system. Based on various conversations with academics, there is a common belief that, not only salary, but also promotion is based on seniority, age, and education, thus leaving little room for gender promotion differences. In fact, the OLS estimation of the rank equation (Table 4) suggests that there may be a seniority-based system at work. Besides institutional characteristics, education level, and employment type<sup>32</sup>, age and total experience are the only highly statistically significant determinants of rank. One might then raise the question of why there is not such a similar seniority system in the case of salary. The answer to such a question could be that, salary is seldom scrutinized while promotion can be more easily scrutinized; thus, discrimination could more easily manifest in salary than in promotion.

## 11 Conclusion

By using a data set of academic economists from Japanese universities, we have conducted the first detailed study of the gender salary gap within Japanese academia. Our data contain detailed information about personal, job, institutional and human capital characteristics. Despite the common belief among Japanese economists that there cannot be a gender salary gap within Japanese academia, our empirical results show that females academic economists receive on average 7% less salary than males, after controlling for detailed personal, job,

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<sup>32</sup>All productivity measures, except working papers published in Japan, are not significant determinants of rank attainment.

institutional, human capital characteristics, and rank. The coefficient for the female dummy is almost the same, regardless of whether rank variables are included or excluded in the salary equation, suggesting that there is a significant gender salary gap *within* each rank, but there are no differences in rank attainment. These results are interesting as they contrast with the results of many previous studies in the US and the UK, which suggest that significant gender salary differences stem from gender rank attainment differences and that the salary gap disappears once rank is included in the salary equation. We offer two possible explanations for why our results are different. First, our results may stem from the fact that in Japan, salary is decided by personnel divisions consisting of non-academics, while promotion decisions are made at the department level. We argued that this type of institutional setting could cause statistical discrimination that manifests in terms of gender salary differences rather than in gender promotion differences. Second, because gender salary differences within Japanese academia have seldom been scrutinized, taste-based discrimination is also likely to manifest through gender salary differences rather than promotion differences. Other important results show that fixed-term employment is associated with 24% lower annual salary, while private university offers a salary premium of 16%. Refereed articles, the most commonly accepted measures of productivity, have no statistically significant effect on salary.

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Figure 1: Salary Profiles

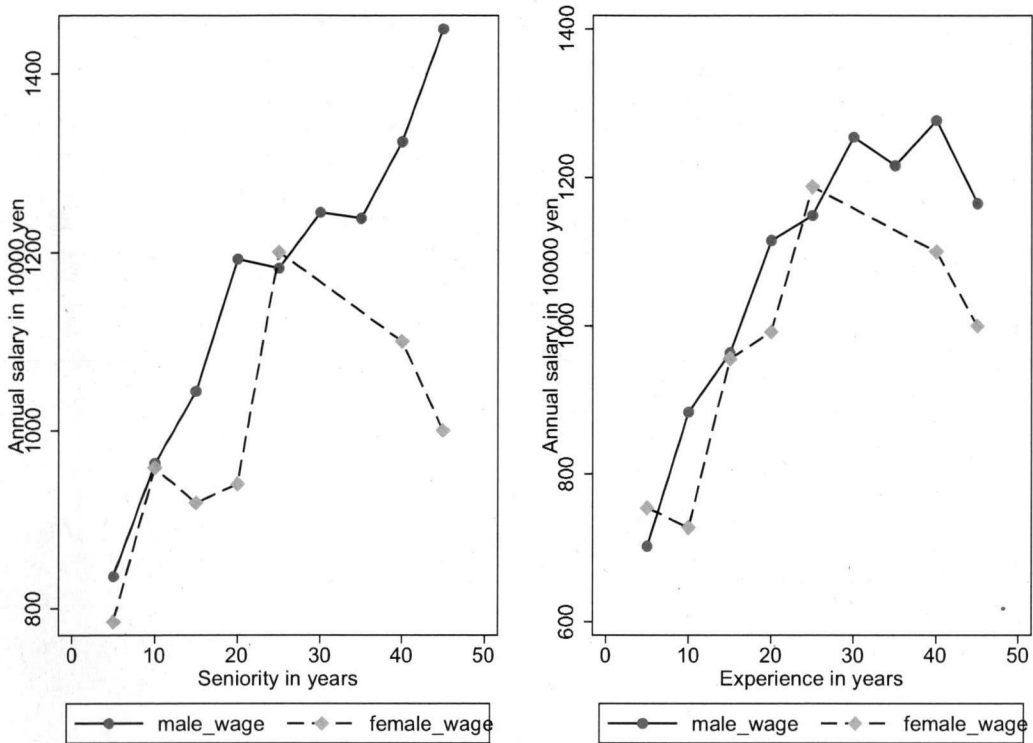


Figure 2: PhD Graduates-Statistics

Figure A: # of PhD graduates in social science

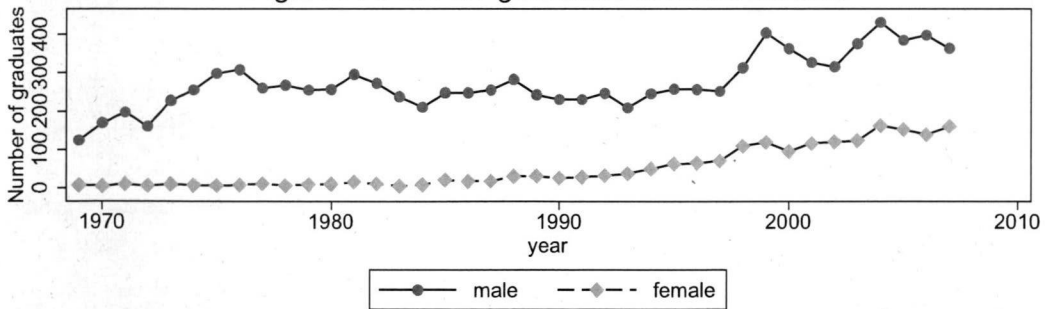
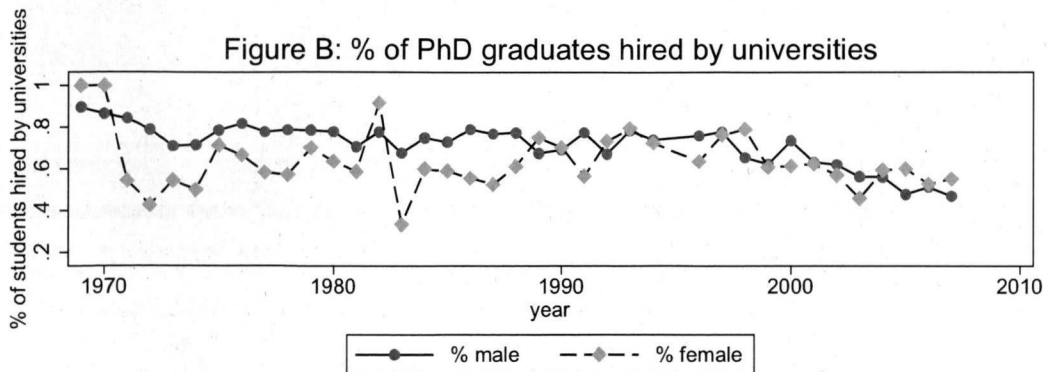


Figure B: % of PhD graduates hired by universities



Source: Based on statistics provided by the MEXT Statistics of School Education (*Gakkou Kihon Chousa*).



Table 1: Definitions of Variables

Name	Definition
<b>Personal characteristics</b>	
Female	1 if female, 0 if male
Age	Age of respondent in 2008
Married	1 if ever married, 0 otherwise
Kids	Number of children under age 6
<b>Job characteristics</b>	
Rank	1 if associate professor, 2 if full-professor, 0 otherwise
AssocProf	1 if associate professor, 0 otherwise
FullProf	1 if full-professor, 0 otherwise
FixTerm	1 if on fixed employment contract, 0 if on non-limited term
Courses	Total number of courses the respondent taught in 2008-2009
Cours1st	Number of courses taught for the first time in 2008-2009
Cours2nd	Number of courses taught for the second time in 2008-2009
Labor	1 if specialized in labor economics, 0 otherwise
FieldMiss	1 if field of specialization is missing observation
Admin	1 if respondent spends more than 50% of working time on administration duties, 0 otherwise
Cohort80	1 if initially hired as academic in the 80s, 0 otherwise
Cohort90	1 if initially hired as academic in the 90s, 0 otherwise
Cohort00-03	1 if initially hired as academic between 2000-2003, 0 otherwise
Cohort04	1 if initially hired as academic from 2004 onward, 0 otherwise
<b>Institutional characteristics</b>	
PrivUniv	1 if academic works in private university, 0 otherwise
PubUniv	1 if academic works in public university, 0 otherwise
BussDep	1 if academic works in business department, 0 otherwise
PhDOffer	1 if the department offers PhD or doctorate (DSc. and DEc.)
IntGrant(in 10,000 yen)	Amount of research grant received from the department in 2007
IntGrMiss	1 if the amount of internal grant is missing observation
COE(in 10,000 yen)	Individual amount of 2007 COE (Center of excellence) grant
COEMiss	1, if the amount of COE is missing
<b>Human capital characteristics</b>	
Seniority	Number of years worked at current employer
Experience	Total number of years worked as academic
NonAExp	Total number of years worked as non-academic
CarBreak	1 if ever took career break, 0 otherwise
PhD	1 if holds a PhD, DSc. or DEc.
PhDAbroad	1 if holds a PhD, DSc. or DEc. from outside Japan
ExtGrant(in 10,000 yen)	Amount of external grant from outside the university in 2007 (the amount is per individual)
ExtGrantMiss	1 if the amount of external grant is missing observation

Table 1 Continued

Name	Definition
	<b>Publication variables below are for the whole career</b>
RefSgJP	Total no. refereed single-authored published in Japan
RefSgUSEU	Total no. refereed single-authored published in US, EUR & other countries
TotRefSg	RefSgJP+RefSgUSEU
RefCoJP	Total no. refereed co-authored published in Japan
RefCoUSEU	Total no. refereed co-authored published in US, EUR & other countries
TotRefCo	RefCoJP+RefCoUSEU
TotRefArticles	TotRefSg+TotRefCo/2
WorkPJP	Total no. of working papers published in Japan
WorkPUSEU	Total no. of working papers published in US, EUR & other countries
TotWorkP	WorkPJP+WorkPUSEU
BookSgJP	Total no. of books single authored published in Japan
BookSgUSEU	Total no. of books single authored published in US, EUR & other countries
TotBookSg	BookSgJP+BookSgUSEU
BookCoJP	Total no. of books co-authored published in Japan
BookCoUSEU	Total no. of books co-authored published in US, EUR & other countries
TotBookCo	BookCoJP+BookCoUSEU
TotBook	TotBookSg+TotBookCo/2
BookEdJP	Total no. of books edited in Japan
BookEdUSEU	Total no. of books edited in the US, EUR & other countries
TotBookEd	BookEdJP+BookEdUSEU
BookChJP	Total no. of book chapters published in Japan
BookChUSEU	Total no. of book chapters published in the US, EUR & other countries
TotBookCh	BookChJP+BookChUSEU
Textbook	Total number of textbooks published in the US, EUR & other countries
PubMiss	1 if the publication record is missing observation
<b>Dependent variable</b>	
Salary(in 10,000 yen)	Total annual salary in 2008

Notes: 1) Doctor of Science (DSc.); Doctor of Economics (DEc.); Europe (EUR) 2) Some respondents did not provide information for (IntGrant), (ExtGrant), (COE) and publications. For such cases, sample averages are imputed. All models include dummy variables which indicate if data were imputed this way (IntGrantMiss; COEMiss; ExtGrantMiss; PubMiss). 3) The number of publications published in 'other countries' is extremely small.

Table 2: Summary Statistics

Variable name	All(n=337)		Male(n=279)		Female(n=58)	
	Mean	Std.	Mean	Std.	Mean	Std.
<b>Personal characteristics</b>						
Female	0.172	0.378	-	-	1	-
Age	49.463	11.317	50.735	11.282	43.345	9.393
Married	0.825	0.381	0.839	0.368	0.759	0.432
Kids	0.157	0.459	0.147	0.437	0.207	0.554
<b>Job characteristics</b>						
Rank	1.546	0.640	1.599	0.615	1.293	0.701
AssocProf	0.294	0.456	0.265	0.442	0.431	0.499
FullProf	0.626	0.485	0.667	0.472	0.431	0.499
FixTerm	0.056	0.230	0.060	0.240	0.034	0.184
Courses	3.024	1.620	2.989	1.691	3.190	1.217
Cours1st	0.467	0.852	0.444	0.818	0.577	0.999
Cours2nd	0.351	0.890	0.336	0.924	0.420	0.706
Labor	0.092	0.289	0.082	0.276	0.138	0.348
FieldMiss	0.036	0.186	0.039	0.195	0.017	0.131
Admin	0.045	0.207	0.047	0.211	0.034	0.184
Cohort80	0.237	0.426	0.251	0.434	0.172	0.381
Cohort90	0.258	0.438	0.251	0.434	0.293	0.459
Cohort00-03	0.151	0.359	0.147	0.355	0.172	0.381
Cohort04	0.160	0.367	0.125	0.332	0.328	0.473
<b>Institutional characteristics</b>						
PrivUniv	0.585	0.494	0.570	0.496	0.655	0.479
PubUniv	0.086	0.281	0.090	0.286	0.069	0.256
BussDep	0.042	0.199	0.039	0.195	0.052	0.223
PhDOffer	0.674	0.470	0.688	0.464	0.603	0.493
IntGrant	52.188	31.569	53.091	32.013	47.845	29.206
IntGrMiss	0.021	0.143	0.025	0.157	0	0
COE	7.086	27.088	7.735	28.543	3.966	18.443
COEMiss	0.045	0.207	0.050	0.219	0.017	0.131
<b>Human capital characteristics</b>						
Seniority	12.739	10.545	13.591	10.708	8.638	8.697
Experience	17.065	11.638	18.332	11.741	10.967	8.970
NonAExp	3.397	7.158	3.434	7.418	3.222	5.798
CarBreak	0.042	0.199	0.025	0.157	0.121	0.329
PhD	0.650	0.478	0.652	0.477	0.638	0.485
PhDAbroad	0.104	0.306	0.111	0.315	0.069	0.256
ExtGrant	69.039	189.411	58.154	90.725	121.401	409.840
ExtGrantMiss	0.151	0.359	0.161	0.368	0.103	0.307
PubMiss	0.068	0.253	0.068	0.252	0.069	0.256

Table 2 Continued

Variable name	All(n=337)		Male(n=279)		Female(n=58)	
	Mean	Std.	Mean	Std.	Mean	Std.
RefSgJP	4.768	9.442	4.902	10.099	4.122	5.254
RefSgUSEU	1.035	2.630	1.081	2.704	0.813	2.252
RefCoJP	2.061	5.747	2.140	5.827	1.677	5.375
RefCoUSEU	1.357	3.808	1.533	4.140	0.507	0.995
WorkPJP	11.449	13.011	12.471	13.679	6.531	7.459
WorkPUSEU	0.099	0.694	0.099	0.723	0.093	0.539
BookSgJP	1.258	2.934	1.301	3.059	1.052	2.248
BookSgUSEU	0.035	0.235	0.038	0.252	0.020	0.131
BooksCoJP	1.995	3.585	2.141	3.757	1.293	2.506
BookCoUSEU	0.105	0.522	0.104	0.510	0.111	0.582
BookEdJP	0.732	1.622	0.799	1.699	0.413	1.134
BookEdUSEU	0.041	0.221	0.042	0.212	0.037	0.262
BookChJP	3.045	5.294	3.128	5.521	2.641	4.038
BookChUSEU	0.334	1.096	0.327	1.027	0.368	1.393
Textbook	0.701	1.521	0.718	1.541	0.617	1.432
<b>Dependent variable</b>						
Salary	1022.300	280.086	1050.007	275.054	889.017	267.610

Table 3: OLS Models (Dependent Variable: Log of Annual Salary)

Variables	OLS 1		OLS 2		OLS 3		OLS 4		OLS 5	
	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank
Female	-0.071*** (0.027)	-0.069*** (0.027)	-0.068*** (0.027)	-0.065** (0.027)	-0.069*** (0.027)	-0.067*** (0.027)	-0.070*** (0.027)	-0.069*** (0.027)	-0.071*** (0.028)	-
AssocProf	0.058 (0.050)	-	0.059 (0.049)	-	0.058 (0.049)	-	0.062 (0.048)	-	-	-
FullProf	0.183*** (0.063)	-	0.187*** (0.063)	-	0.187*** (0.062)	-	0.189*** (0.060)	-	-	-
Rank	-	-	-	-	-	-	-	-	0.100*** (0.030)	-
<b>Personal</b>										
Age	0.032** (0.015)	0.040*** (0.015)	0.032** (0.014)	0.040*** (0.015)	0.033** (0.014)	0.041*** (0.014)	0.036*** (0.014)	0.044*** (0.014)	0.032** (0.015)	-
Age <sup>2</sup>	-0.0002* (0.0002)	-0.0003** (0.0002)	-0.0003* (0.0001)	-0.0003** (0.0001)	-0.0003* (0.0001)	-0.0003** (0.0001)	-0.0003** (0.0001)	-0.0004** (0.0001)	-0.0002* (0.0002)	-
Married	0.049** (0.025)	0.048* (0.025)	0.047** (0.025)	0.048* (0.025)	0.050** (0.025)	0.049** (0.025)	0.048** (0.024)	0.047* (0.025)	0.048* (0.025)	-
Kids	0.031** (0.014)	0.021* (0.014)	0.031** (0.014)	0.021 (0.014)	0.031** (0.013)	0.020 (0.014)	0.029** (0.014)	0.017 (0.014)	0.029** (0.014)	-
<b>Job</b>										
FixTerm	-0.243*** (0.070)	-0.266*** (0.075)	-0.240*** (0.071)	-0.261*** (0.076)	-0.241*** (0.071)	-0.262*** (0.076)	-0.238*** (0.070)	-0.261*** (0.075)	-0.229*** (0.068)	-
Courses	-0.011* (0.006)	-0.010 (0.006)	-0.011* (0.006)	-0.009 (0.006)	-0.011* (0.006)	-0.009 (0.006)	-0.010* (0.007)	-0.009 (0.006)	-0.011* (0.006)	-
Cours1st	-0.010 (0.015)	-0.011 (0.015)	-0.009 (0.015)	-0.009 (0.015)	-0.010 (0.014)	-0.010 (0.015)	-0.010 (0.015)	-0.011 (0.015)	-0.009 (0.015)	-
Cours2nd	0.015 (0.012)	0.013 (0.011)	0.014 (0.012)	0.012 (0.011)	0.013 (0.012)	0.011 (0.011)	0.015 (0.012)	0.012 (0.011)	0.017 (0.013)	-

Table 3 Continued

Variables	OLS 1		OLS 2		OLS 3		OLS 4		OLS 5	
	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank
Labor	0.069** (0.034)	0.073** (0.035)	0.068** (0.033)	0.073** (0.035)	0.068** (0.033)	0.072** (0.034)	0.070** (0.032)	0.072** (0.033)	0.069** (0.034)	0.069** (0.034)
Admin	0.015 (0.041)	0.028 (0.044)	0.018 (0.041)	0.030 (0.043)	0.021 (0.040)	0.034 (0.043)	0.019 (0.040)	0.034 (0.041)	0.017 (0.042)	0.017 (0.042)
Cohort80	0.008 (0.037)	0.012 (0.038)	0.014 (0.038)	0.019 (0.039)	0.015 (0.038)	0.021 (0.039)	0.021 (0.039)	0.028 (0.040)	0.010 (0.037)	0.010 (0.037)
Cohort90	-0.026 (0.063)	-0.011 (0.064)	-0.014 (0.063)	0.004 (0.065)	-0.012 (0.064)	0.007 (0.065)	-0.005 (0.064)	0.016 (0.065)	-0.028 (0.063)	-0.028 (0.063)
Cohort00-03	0.047 (0.084)	0.045 (0.086)	0.062 (0.085)	0.063 (0.087)	0.063 (0.085)	0.063 (0.086)	0.067 (0.086)	0.073 (0.087)	0.037 (0.083)	0.037 (0.083)
Cohort04	-0.022 (0.103)	-0.030 (0.106)	0.0001 (0.102)	-0.005 (0.105)	0.0005 (0.102)	-0.005 (0.104)	0.013 (0.103)	0.009 (0.105)	-0.017 (0.102)	-0.017 (0.102)
<b>Institutional</b>										
PrivUniv	0.161*** (0.020)	0.166*** (0.020)	0.163*** (0.019)	0.168*** (0.019)	0.163*** (0.019)	0.169*** (0.019)	0.162*** (0.018)	0.169*** (0.018)	0.162*** (0.020)	0.162*** (0.020)
PubUniv	-0.013 (0.028)	-0.007 (0.028)	-0.017 (0.028)	-0.012 (0.028)	-0.017 (0.027)	-0.010 (0.027)	-0.027 (0.028)	-0.019 (0.028)	-0.011 (0.028)	-0.011 (0.028)
BussDep	0.069 (0.065)	0.097 (0.071)	0.059 (0.064)	0.087 (0.070)	0.058 (0.064)	0.086 (0.069)	0.045 (0.064)	0.071 (0.069)	0.071 (0.067)	0.071 (0.067)
PhDOffer	0.073*** (0.020)	0.073*** (0.021)	0.077*** (0.020)	0.077*** (0.020)	0.077*** (0.020)	0.077*** (0.020)	0.084*** (0.020)	0.085*** (0.020)	0.075*** (0.020)	0.075*** (0.020)
IntGrant	-0.0001 (0.0003)	-0.00005 (0.0003)	-0.0001 (0.0003)	-0.00007 (0.0003)	-0.00009 (0.0003)	-0.00004 (0.0003)	-0.0001 (0.0003)	-0.00008 (0.0003)	-0.0001 (0.0003)	-0.0001 (0.0003)
COE	0.0003 (0.0003)	0.0002 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)	0.0003 (0.0003)

Table 3 Continued

Variables	OLS 1		OLS 2		OLS 3		OLS 4		OLS 5	
	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank
<b>Human capital</b>										
Seniority	-0.0008 (0.005)	-0.0009 (0.005)	-0.00002 (0.004)	0.0001 (0.004)	-0.0003 (0.004)	-0.0002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	-0.001 (0.005)
<i>Seniority</i> <sup>2</sup>	0.0002 (0.0001)	0.0002 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)	0.0002 (0.0001)	0.0001 (0.0001)	0.00009 (0.0001)	0.00007 (0.0001)	0.00007 (0.0001)	0.0002 (0.0001)
Experience	0.009 (0.010)	0.015* (0.010)	0.010 (0.009)	0.017* (0.010)	0.010 (0.009)	0.016* (0.009)	0.009 (0.009)	0.015* (0.009)	0.015* (0.009)	0.010 (0.010)
<i>Experience</i> <sup>2</sup>	-0.0002 (0.0002)	-0.0003* (0.0002)	-0.0002 (0.0002)	-0.0004* (0.0002)	-0.0002 (0.0002)	-0.0003* (0.0002)	-0.0002 (0.0002)	-0.0003 (0.0002)	-0.0003 (0.0002)	-0.0003 (0.0002)
NonAExp	0.005 (0.005)	0.005 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.005 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)	0.006 (0.005)
<i>NonAExp</i> <sup>2</sup>	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0001)	-0.0002 (0.0002)	-0.0002 (0.0001)	-0.0001 (0.0002)	-0.0002 (0.0001)	-0.0001 (0.0002)	-0.0001 (0.0002)	-0.0002 (0.0001)
CarBreak	-0.075 (0.060)	-0.077 (0.065)	-0.073 (0.060)	-0.075 (0.064)	-0.072 (0.059)	-0.073 (0.064)	-0.069 (0.060)	-0.071 (0.065)	-0.071 (0.065)	-0.075 (0.060)
PhD	0.023 (0.019)	0.032* (0.019)	0.022 (0.019)	0.031* (0.019)	0.023 (0.019)	0.032* (0.019)	0.029 (0.019)	0.039** (0.019)	0.039** (0.019)	0.022 (0.020)
PhDAbroad	0.056** (0.028)	0.056** (0.029)	0.068*** (0.028)	0.069** (0.029)	0.065** (0.027)	0.065** (0.028)	0.057** (0.026)	0.055** (0.027)	0.055** (0.027)	0.055** (0.027)
ExtGrant	0.0001*** (0.00004)	0.0001*** (0.00004)	0.00009*** (0.00004)	0.0001*** (0.00004)	0.00009*** (0.00004)	0.0001*** (0.00004)	0.0001*** (0.00003)	0.0001*** (0.00004)	0.0001*** (0.00004)	0.0001*** (0.00004)
RefSgJP	-0.0003 (0.001)	-0.0005 (0.001)	-	-	-	-	-	-	-	-0.0003 (0.001)
RefSgUSEU	0.005 (0.006)	0.005 (0.006)	-	-	-	-	-	-	-	0.005 (0.006)

Table 3 Continued

Variables	OLS 1		OLS 2		OLS 3		OLS 4		OLS 5	
	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank
TotRefSg	-	-	0.0006 (0.0008)	0.0005 (0.0008)	-	-	-	-	-	-
RefCoJP	-0.0008 (0.002)	-0.0006 (0.002)	-	-	-	-	-	-	-0.0007 (0.002)	-
RefCoUSEU	-0.002 (0.003)	-0.002 (0.003)	-	-	-	-	-	-	-0.002 (0.003)	-
TotRefCo	-	-	-0.0006 (0.001)	-0.0004 (0.001)	-	-	-	-	-	-
TotRefArticles	-	-	-	-	0.0002 (0.0007)	0.0001 (0.0007)	0.0003 (0.0006)	0.0003 (0.0006)	-	-
WorkPJP	0.001 (0.0008)	0.002** (0.0008)	-	-	-	-	-	-	0.001 (0.0008)	-
WorkPUSEU	-0.016 (0.011)	-0.016 (0.011)	-	-	-	-	-	-	-0.016 (0.011)	-
TotWorkP	-	-	0.0007 (0.0008)	0.001* (0.0008)	0.0007 (0.0008)	0.001* (0.0008)	-	-	-	-
BookSgJP	0.00007 (0.003)	0.0004 (0.003)	-	-	-	-	-	-	0.00007 (0.003)	-
BookSgUSEU	0.010 (0.026)	0.011 (0.026)	-	-	-	-	-	-	0.011 (0.026)	-
TotBookSg	-	-	-0.0009 (0.003)	-0.0006 (0.003)	-	-	-	-	-	-
BookCoJP	0.002 (0.003)	0.003 (0.003)	-	-	-	-	-	-	0.003 (0.003)	-
BookCoUSEU	0.016 (0.014)	0.020* (0.013)	-	-	-	-	-	-	0.017 (0.014)	-



Table 3 Continued

Variables	OLS 1		OLS 2		OLS 3		OLS 4		OLS 5	
	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank	with rank	without rank
TotBookCo	-	-	0.002 (0.003)	0.003 (0.003)	-	-	-	-	-	-
TotBooks	-	-	-	-	0.0008 (0.003)	0.001 (0.003)	-	-	-	-
BookEdJP	0.007 (0.007)	0.006 (0.007)	-	-	-	-	-	-	0.007 (0.007)	-
BookEdUSEU	-0.020 (0.027)	-0.033 (0.025)	-	-	-	-	-	-	-0.023 (0.026)	-
TotBookEd	-	-	0.008 (0.006)	0.007 (0.007)	0.009 (0.006)	0.008 (0.007)	-	-	-	-
BookChJP	0.001 (0.002)	0.0007 (0.002)	-	-	-	-	-	-	0.001 (0.002)	-
BookChUSEU	0.017* (0.009)	0.017** (0.008)	-	-	-	-	-	-	0.017** (0.008)	-
TotBookCh	-	-	0.002 (0.002)	0.002 (0.002)	0.002 (0.001)	0.001 (0.002)	-	-	-	-
Textbook	-0.002 (0.007)	-0.001 (0.007)	-0.003 (0.006)	-0.002 (0.007)	-0.002 (0.006)	0.00002 (0.006)	-	-	-0.002 (0.007)	-
Constant	5.535*** (0.349)	5.351*** (0.352)	5.499*** (0.333)	5.309*** (0.333)	5.482*** (0.329)	5.285*** (0.328)	5.403*** (0.336)	5.203*** (0.331)	5.508*** (0.349)	-
No.obs.	337	337	337	337	337	337	337	337	337	337
R <sup>2</sup>	0.78	0.76	0.77	0.76	0.77	0.76	0.77	0.75	0.78	-

Notes: 1) Inside the parentheses are robust standard errors. \*\*\*Significant at the 1%, \*\* at the 5%, \* at the 10% level. 2) Although not reported here, regressions include (FieldMiss), (IntGrantMiss), (COEMiss), (ExtGrantMiss), (PubMiss).

Table 4: Rank Attainment Regressions (Dependent Variable: Rank)

Variables	Logit		OLS	
	Coef.	Std.Err.	Coef.	Std.Err.
<b>Personal characteristics</b>				
Female	0.092	(0.602)	0.023	(0.068)
Age	0.207	(0.430)	0.080***	(0.030)
<i>Age</i> <sup>2</sup>	-0.0001	(0.005)	-0.0006**	(0.0003)
Married	-0.148	(0.582)	-0.001	(0.065)
Kids	-0.610*	(0.352)	-0.080**	(0.040)
<b>Job characteristics</b>				
FixTerm	-6.766***	(1.964)	-0.368*	(0.142)
Courses	0.040	(0.189)	0.020	(0.014)
Cours1st	0.135	(0.287)	-0.020	(0.033)
Cours2nd	-0.351	(0.278)	-0.037	(0.040)
Labor	0.578	(0.666)	0.043	(0.061)
Admin	0.934	(1.079)	0.113	(0.102)
Cohort80	-1.906	(2.363)	0.023	(0.082)
Cohort90	-2.106	(3.237)	0.168	(0.144)
Cohort00-03	-2.883	(3.550)	0.077	(0.210)
Cohort04	-4.565	(3.837)	-0.127	(0.274)
<b>Institutional characteristics</b>				
PrivUniv	0.960*	(0.624)	0.040	(0.045)
PubUniv	0.231	(1.072)	0.044	(0.087)
BussDep	6.391***	(1.853)	0.256***	(0.093)
PhDOffer	-0.727	(0.641)	-0.013	(0.041)
IntGrant	0.013***	(0.005)	0.001**	(0.0004)
COE	-0.009	(0.008)	-0.00007	(0.0006)
<b>Human capital characteristics</b>				
Seniority	0.313	(0.278)	0.001	(0.009)
<i>Seniority</i> <sup>2</sup>	-0.018*	(0.011)	-0.0001	(0.0002)
Experience	0.223	(0.411)	0.054***	(0.021)
<i>Experience</i> <sup>2</sup>	0.004	(0.015)	-0.0008**	(0.0004)
NonAExp	0.002	(0.102)	-0.007	(0.010)
<i>NonAExp</i> <sup>2</sup>	0.003	(0.005)	0.0004	(0.0004)
CarBreak	1.129	(1.085)	-0.021	(0.092)
PhD	1.656***	(0.542)	0.095**	(0.044)
PhDAbroad	-1.252	(0.984)	0.005	(0.079)
ExtGrant	0.008**	(0.004)	0.00007	(0.0001)
RefSgJP	0.004	(0.051)	-0.002	(0.002)
RefSgUSEU	0.065	(0.126)	0.002	(0.007)
RefCoJP	0.267**	(0.148)	0.001	(0.003)
RefCoUSEU	0.009	(0.107)	-0.001	(0.004)
WorkPJP	0.180***	(0.056)	0.004***	(0.001)
WorkPUSEU	-0.455	(0.433)	0.001	(0.014)
BookSgJP	0.0389	(0.210)	0.003	(0.006)

Table 4 Continued

Variables	Logit		OLS	
	Coef.	Std.Err.	Coef.	Std.Err.
BookSgUSEU	0.553	(1.775)	0.005	(0.056)
BookCoJP	0.346**	(0.148)	0.004	(0.005)
BookCoUSEU	0.128	(0.346)	0.036	(0.026)
BookEdJP	0.130	(0.304)	-0.006	(0.010)
BookEdUSEU	-0.613	(2.001)	-0.099	(0.073)
BookChJP	-0.085*	(0.051)	-0.004	(0.006)
BookChUSEU	-0.194	(0.443)	0.005	(0.020)
Textbook	0.151	(0.231)	0.010	(0.012)
Constant			-1.571***	(0.742)
Cut1	6.262	(8.989)		
Cut2	14.202	(9.257)		
<b>Marginal effect</b>				
<i>Female</i> =	0.002			
<i>PhD</i> =	0.06			
No.obs.	337		337	
PseudoR <sup>2</sup>	0.74		0.76	

Notes: 1) Inside the parentheses are robust standard errors. \*\*\*Significant at the 1%, \*\* at the 5%, \* at the 10% level. 2) Although not reported here, regressions include (FieldMiss), (IntGrantMiss), (COEMiss), (ExtGrantMiss), (PubMiss).

Table 5: The National Personnel Authority Salary Table Guideline (Excerpt)

	Class 2	Class 3	Class 4	Class 5
Division	Monthly Salary (in 100 yen)	Monthly Salary (in 100 yen)	Monthly Salary (in 100 yen)	Monthly Salary (in 100 yen)
1	2022	2635	3170	4091
2	2044	2666	3250	4116
3	2066	2697	3240	4141
4	2088	2728	3275	4166
5	2109	2759	3311	4192
6	2131	2788	3346	4217
7	2153	2817	3381	4242
8	2175	2846	3416	4267
9	2198	2876	3454	4290
10	2222	2906	3485	4315
⋮	⋮	⋮	⋮	⋮
75	3468	4194	4566	5524
76	3478	4203	4576	5533
77	3489	4210	4586	5542
78	3499	4216	4593	5551
79	3509	4222	4600	5560
80	3591	4228	4607	5569
81	3529	4234	4615	5578
82	3539	4240	4622	-
83	3549	4216	4629	-
84	3559	4252	4636	-
⋮	⋮	⋮	-	-

Source: 2006 National Personnel Authority Salary Table Guideline (in Japanese). Class 2 has up to 141 divisions and Class 3 has up to 117 divisions.