

Gender wage differentials in private and public sector jobs

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Abstract. In this study gender wage differentials in private and public sector jobs in Austria are calculated. Occupational attainment is considered as endogeneous by the use of an ordered response model. Results show that wage discrimination is also present in the public sector, though on a lower level. Both in private firms and for public servants a substantial part of this unwarranted differential is due to unequal professional advancement.

1. Introduction

Wages in the public sector have been extensively studied in the past decade; this is motivated by the rising pay-roll for government servants and growing public deficits. Owing to comparability legislation for governmental wage policies in the United States, research has concentrated on differentials between private and public sector workers (Quinn 1979; Smith 1976; Ehrenberg and Schwarz 1986). This research concluded that men in public sector jobs enjoy a premium in pay over the private sector, but that rents for women are even higher¹ (Gunderson 1989).

In this study we approach the problem from another point of view: the occurrence of gender wage differentials. Different outcomes in different jobs may be the result of different discrimination practices. In theory, employer discrimination

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¹ Shackett and Trapani (1987) find that wages are highest in private regulated industries. See Pedersen et al. (1990) and Katz and Krueger (1991) for recent studies for Denmark and the United States.

should be eliminated by competition. Accordingly, sex discrimination is found to be higher in concentrated markets (Ashenfelter and Hannan 1986). In the public sector things are different for several reasons. There is no profit constraint, so that employers are not forced by the market. On the other hand, equal pay and affirmative action policies should apply to the public sector first of all. Moreover, strict pay schemes should make unequal wages for equal jobs nearly impossible.

In looking at gender discrimination in the public sector we also want to concentrate on job assignments. Usually human capital wage functions are augmented by specific job characteristics to account for influences like union status, sectors or occupations. These variables indeed model characteristics of different jobs, but are mostly the result of optimizing behavior of the agents themselves (self-selection, Polachek 1981), so that no discriminatory practice is possible. The salient point in public sector wage determination is the professional advancement of females compared to males. Decisions about promotions and occupational status are in the sole discretion of the supervisor and might be an easily accessible substitute for (illegal) pay discrimination.

In the next section wage functions with and without the inclusion of occupational status are run and pay gaps are calculated. In Sect. 3 wage differentials are reported for different steps in the job ladder to look at earnings within more narrow jobs. Sect. 4 analyzes occupational advancement of men and women. Gender wage differentials are split up into endowment effects and effects due to discrimination both in promotion and in wage determination. The concluding section summarizes the results.

2. The pay gap

For the empirical study we use data from the Austrian microcensus of 1983. Wage determination in Austria is known to be highly centralized. In the private sector only basic wages are fixed, allowing a positive wage drift in firms. In the public sector all workers are covered by collective bargaining; this includes public servants. Since only 8% of governmental employees were blue-collar workers we confined the comparison to white-collar public and white-collar private workers² aged 20–60, a procedure which is also sensible as we consider career advancement on job ladders and are thus obliged to have a strict hierarchy of job positions. The 1983-survey asked individuals for their job-position, characterized by the skill intensities and/or training requirements. The reported categories are: (i) unskilled (no schooling and training requirements), (ii) low skilled (apprenticeship or equivalent education), (iii) medium skilled (middle school level or equivalent), (iv) high skilled (high school degree or equivalent), (v) leading (university degree or equivalent) and (vi) leading manager in large firms/institutions.³

For our remaining sample we receive a gender wage gap of 37% in the private and only 12% in the public sector. In the first place, wage functions following (1)

² Most studies (Gunderson 1979; Smith 1976) use manufacturing workers as a control group, which is not suitable in our opinion, as the performed jobs are too diverse.

³ The questionnaire gives examples for the respective categories. The exact definitions for positions (v) and (vi) were (in German): (v) Hochqualifizierte Tätigkeit in Angestelltenberufen, (vi) Führende Tätigkeit in größeren Betrieben.

and (2) are run for the 4 subpopulations (male private, female private, male public, female public). In (2) in addition to the set of explanatory variables X_i used in (1) also a vector of dummies for the occupational job positions P_i of the workers is included.

$$\ln W_i = aX_i + u_i \quad (1)$$

$$\ln W_i = aX_i + bP_i + u_i, \quad (2)$$

where $\ln W_i$ denote average hourly earnings measured in logarithmic terms, and i is an individual index. It should be noted, that the error terms of (1) and (2) suffer from potential biases. One source of bias comes from the endogeneity of the work decision. This concerns only the female samples, since only a negligible proportion of men did not participate in the labor force. Since we restrict the sample to either private or public-sector white-collar workers, there is a second sample-selection problem: occupational choice. This type of selectivity, of course, concerns men and women alike. To account for these problems we calculated selectivity correction terms from univariate (men) and bivariate (women) probit regressions, respectively.⁴ These appear as regressors on the r.h.s. of (1) and (2).

Control variables, besides the usual human capital proxies, years of education and actual work experience, include agglomeration advantages (city size), marital status and children, weekly working time, and regional and industry dummies. In the public sector regressions, special dummies for being a teacher are brought in. Calculated years of work interruptions appear in all equations.

The results in Table 1⁵ concentrate on (2)⁶. The explanatory power is higher in the public sector because of stricter salary scales. All coefficients – except those for work interruptions and foreigners – show the expected sign. Work interruptions are calculated as “age – minimal years of schooling for a certain degree – 6 – actual experience”. This indicator has to be interpreted with care because of imprecise measurement. It should be a sum of true interruptions with negative wage effects and spurious ones, i.e. years of job experience or additional education, with a positive wage impact. This should be especially important for men where true interruptions are supposed to occur more seldomly. In addition, due to collective bargaining agreements in the public sector, women enjoy pay advancements on a reduced scale even during periods of maternity leave. The share of foreigners in the sample is very small, ranging from 2% for men in the private sector to 0.3% for men in the public sector, which may mainly consist of academics. Teachers receive a bonus of 4–5% which may be due to their shorter hours of work per week. With one exception sample selectivity bias does not seem to be a serious problem. For women, neither the selectivity variable for participation, nor for sectoral choice indicates a significant sample selection problem. The same is true for male workers in the public sector. However, it seems to be of some importance in the case of male private sector employees.

⁴ Bivariate probit analyses for women take into account that observation of occupational choice is contingent upon participation in the labor force. A similar econometric model is discussed in Zweimüller (1992).

⁵ *T*-values are based on the correct asymptotic covariance matrix for the two step estimator (Greene 1992, p. 605 f.).

⁶ Results of the regressions without occupational dummies are presented in the Appendix.

Table 1. Wage functions (*t*-values in parentheses)

	Private sector		Public sector	
	Males	Females	Males	Females
Constant	4.341 (40.3)	3.902 (37.8)	4.309 (18.2)	4.180 (2.5)
Years of schooling	0.010 (2.3)	0.025 (3.4)	0.021 (2.4)	0.030 (0.5)
Apprentice training	0.002 (0.1)	-0.010 (0.6)	0.014 (0.8)	-0.040 (0.4)
Experience	0.028 (12.0)	0.018 (7.2)	0.021 (7.5)	0.019 (1.7)
Experience ²	-0.0004 (8.4)	-0.0002 (3.2)	-0.0002 (3.8)	-0.0002 (1.5)
Work interruptions	0.008 (5.8)	0.003 (3.0)	0.008 (4.9)	0.008 (1.8)
City size (<2000)				
2-1000	-0.004 (0.2)	0.016 (0.9)	-0.001 (0.1)	0.035 (0.4)
10-100000	0.015 (0.6)	0.083 (3.7)	0.023 (1.0)	0.064 (0.7)
>100000	0.034 (1.5)	0.098 (4.8)	0.073 (3.0)	0.004 (0.1)
Married	0.102 (5.3)	-0.119 (2.1)	0.026 (1.0)	0.130 (0.3)
Children <4 years	0.048 (7.0)	0.014 (1.6)	0.076 (10.6)	0.035 (0.5)
Weekly working time	-0.015 (13.2)	-0.010 (11.8)	-0.017 (11.8)	-0.026 (16.0)
Region (Swiss border)				
West	-0.080 (3.4)	-0.080 (2.9)	-0.076 (2.3)	-0.050 (0.6)
Central	-0.109 (5.0)	-0.103 (4.1)	-0.046 (1.5)	-0.013 (0.2)
East	-0.096 (4.2)	-0.039 (1.4)	-0.052 (1.6)	0.002 (0.3)
Foreigner	0.088 (1.8)	0.019 (0.4)	0.288 (1.9)	0.061 (0.3)
Occupation (Seasonal)				
Production	0.104 (2.9)	-0.060 (1.0)	-	-
Service	0.108 (3.5)	-0.035 (0.8)	-	-
Industry (Manufacturing)				
Mining, construction	0.033 (1.3)	-0.034 (0.8)	-	-
Trade, hotels	-0.018 (1.0)	-0.068 (3.6)	-	-
Transport, energy	-0.030 (1.3)	-0.038 (1.1)	-	-
Finance, insurance	0.011 (0.6)	-0.006 (0.3)	-	-
Other service	-0.089 (4.6)	0.008 (0.4)	-	-
Teacher	-	-	0.053 (2.2)	0.041 (1.3)
Professional position (unskilled)				
Low skilled	0.070 (3.3)	0.115 (5.5)	0.096 (2.3)	0.121 (2.0)
Medium skilled	0.188 (9.3)	0.254 (11.7)	0.239 (5.9)	0.358 (6.2)
High skilled	0.291 (12.9)	0.314 (9.7)	0.313 (7.4)	0.393 (5.0)
Leading	0.453 (15.2)	0.573 (9.3)	0.490 (10.4)	0.578 (6.2)
Leading manager	0.594 (18.2)	0.767 (6.6)	0.608 (8.3)	-
λ_1	-0.076 (2.4)	-0.008 (0.2)	-0.084 (1.1)	0.149 (0.5)
λ_2	-	0.015 (0.3)	-	-0.167 (0.3)
\bar{R}^2	0.542	0.361	0.516	0.671
SEE	0.263	0.271	0.267	0.262
N	1849	2053	1429	561

The general picture yields an experience profile flatter than that of other countries (Wagner 1990); rewards for experience differ by gender in the private but not in the public sector. The diverging influence of marriage on pay in the private sector is consistent with Becker's (1985) argument that women spend less effort on each hour of market work owing to the changing strain of housework following marriage and the setup of a common household. As we use after-tax hourly incomes, progressive taxation is reflected in the working time variable. As expected,

Table 2. Decomposition of wage differentials

	Private		Public	
	B-O-I ^a	B-O-II ^b	B-O-I	B-O-II
Excluding occ. positions				
– Endowments	–0.015	0.011	–0.071	–0.050
– Discrimination	0.383	0.357	0.189	0.168
Including occ. positions				
– Endowments	0.051	0.074	–0.084	0.019
– Discrimination	0.317	0.294	0.202	0.099
Actual differentials	0.368	0.368	0.118	0.118

^aBlinder-Oaxaca Measure I: endowment differences evaluated at female coefficients.

^bBlinder-Oaxaca Measure II: endowment differences evaluated at male coefficients.

occupational positions raise the explanatory power of the wage functions by a large amount, on average by 0.083 percentage points.

Following the well-known discrimination decomposition of Blinder (1973) and Oaxaca (1973) we can split up wage differentials in the following way (\bar{X} , \bar{P} denoting mean values):

$$\begin{aligned}
 \ln W_m - \ln W_f &= (a_m \bar{X}_m + b_m \bar{P}_m) - (a_f \bar{X}_f + b_f \bar{P}_f) \\
 &= [(\bar{X}_m - \bar{X}_f) a_f + (\bar{P}_m - \bar{P}_f) b_f] \quad \dots \text{endowments I} \\
 &\quad + [(a_m - a_f) \bar{X}_m + (b_m - b_f) \bar{P}_m] \quad \dots \text{discrimination I} \quad (3)
 \end{aligned}$$

If occupational positions are included in the wage functions, a discrimination component of 30% for white-collar workers is on the upper bound of international (Gundersen 1989; Cain 1986) and former Austrian (Christl 1985) evidence. In the public sector where gross wage differentials are smaller, nonetheless high discrimination components are found. Females in the public sector are generally better educated than men; endowing them with male productivity characteristics will lead to even lower wages. Comparing the two Blinder-Oaxaca measures for the decomposition of differentials, we find surprisingly small differences for private white-collar workers, which makes a separate Neumark (1988) decomposition unnecessary. In the public sector results are a bit unclear. Excluding occupational status the results are fairly stable, which is not the case in the lower part of the panel: unexplained differentials range from 10–20%, if occupational positions are included in the wage regressions.

We proceed in two directions to shed further light on this issue. i) By looking at wage differentials within occupational positions we can analyse discrimination patterns on different levels of the job ladder; the groups under consideration become also more homogeneous in this respect. ii) In a second step (Chap. 4) the process of moving up the job ladder is modelled separately to show differences in occupational attainment and the consequences for wages.

3. Wage differentials by occupational rank

Following the specifications in Table 1, separate wage regressions by sex and occupational status are run. Owing to the low number of females in upper positions, several categories are lumped together.

Raw wage differentials – shown in Table 3 – are decreasing with rank in both sectors. The comprehended upper rank groups must be taken with care, because they comprise different male/female ratios in the respective positions. In the private sector the differential falls to 0.09 in position 4, rising again in the top management group 5 to 0.264. In the public sector upper pay bounds reduce differentials to 0.088 in rank 3 and 0.069 in rank 4 (not reported in Table 3).

Table 3. Decomposition^a of wage differentials by occupational rank

Rank	Wage differential	Endowment I	Discrimination I	Endowment II	Discrimination II
<i>Private sector</i>					
0	0.330	0.053	0.277	-0.005	0.335
1	0.285	0.057	0.228	-0.004	0.289
2	0.246	0.052	0.194	-0.004	0.250
3	0.243	0.048	0.195	-0.051	0.297
4, 5 ^b	0.174	0.010	0.164	-0.097	0.271
<i>Public sector</i>					
0	0.220	0.008	0.212	-0.098	0.318
1	0.210	0.054	0.156	-0.142	0.352
2	0.133	0.084	0.049	-0.110	0.243
3, 4, 5 ^b	0.141	0.018	0.123	-0.051	0.192

^a Control variables as in Table 1 without selection and rank terms. Occasionally dummy variables had to be eliminated because of zero cell density.

^b Lumped together owing to small number of females for the separate wage regressions.

Different endowments cannot explain different performance in any sub-group, the unexplained residuals are large. Following the raw differential pattern, discrimination coefficients decline slightly with rising skill level. This confirms results for Germany in certain respects: Brandes et al. (1989) also describe discrimination highest in low skill groups, but they did not find such a regularly decreasing pattern as we did for Austria. One has to keep in mind, that there is the general difficulty of not being able to observe all productivity-promoting characteristics, which might hamper this kind of decomposition. One missing variable is information on job tenure which should be especially important for the public sector.

4. Advancement in occupational positions

Promotion into better positions often incurs training costs. Besides productivity, the profitability of this investment depends upon the expected future job tenure of the candidate. If women have a shorter time horizon in market work because of the comparative advantage in outside opportunities, a profit maximizing firm will require higher qualification standards for promotion in the case of women compared to men (Lazear and Rosen 1990). Consider a situation where men and

women are equally productive in labor market activities, but differ in their quit propensities. It is natural to assume that the probability of separation is higher for women than for men, if women have a comparative advantage in outside (non-market) opportunities. Suppose the firm cannot observe the non-market productivity of the individuals, but has some idea about their distribution. If the distribution of men's non-market skills stochastically dominates the distribution of those of women, firms will demand strictly higher promotion requirements for women.⁷

Similar arguments are used in the context of dual labor markets (Bulow and Summers 1986). Also in this setting, productivity differentials between men and women are absent. However, the shorter time horizon of women in primary sector jobs would require the firms to pay higher wages for women to induce them not to shirk. As a consequence men will enter the good jobs, where women will be crowded in the secondary sector.

It is obvious that the crucial variable in assigning equally productive workers to different jobs is the workers' separation probability. We will return to this issue below. In 1983 Austrian white-collar private and public-sector workers were distributed in the following way:

Table 4. Actual rank distribution (%)⁸

	0	1	2	3	4	5
Private sector						
Males	14.0	21.4	27.5	20.0	11.1	6.0
Females	14.1	37.0	37.5	8.7	2.4	0.3
Public sector						
Males	3.2	20.6	35.6	27.8	11.4	1.4
Females	9.6	12.5	24.5	49.0	4.4	0.0

Whereas men are clearly overrepresented in the upper ranks of the private sector, no such simple diagnosis is possible for public servants, due to the crowding of female teachers in position 3. Since six ranked career positions are observed, the advancement model leads empirically to an ordered response specification, which can be written as follows. Assume that actual abilities of the workers can be represented by

$$\delta_i = \beta Z_i + \varepsilon_i . \quad (4)$$

Let μ_j be the productivity threshold to be overcome for promotion from job level $(j-1)$ to level j . The probability of being in state j of the job ladder is given by

⁷ It is worth noting, that the Lazear and Rosen (1990) model predicts lower wage differentials for higher ranks, because of higher promotion requirements for women. This is in line with results in Table 3.

⁸ Rank assignment in public and private sector is not directly comparable, because the categories are differently defined.

$$\begin{aligned}
 P_j &= Pr(\beta Z_i + \varepsilon_i > \mu_j) - Pr(\beta Z_i + \varepsilon_i > \mu_{j+1}) \\
 &= G(\mu_{j+1} - \beta Z_i) - G(\mu_j - \beta Z_i) .
 \end{aligned}
 \tag{5}$$

G is the distribution function of ε_i . Let us take a closer look at the ability thresholds, which we assume to be determined differently for men and women. To account for females' lower work attachment we included years of past work interruptions h and expected future fertility risk α as variables affecting women's thresholds, work interruptions h are included for men as well. In particular, we proxy women's threshold $\mu_{j,f}$ by the following relation

$$\mu_{j,f} = \bar{\mu}_{j,f} + \phi_1 h_f + \phi_2 \alpha_{lk} \tag{6}$$

with $\alpha_{lk} = 1 - \prod_{n=1}^5 (1 - Pr(\text{birth} | \text{age } l+n, \text{ number of children } k))$.

α_{lk} gives the probability that a women of age l having k children will bear a further child within the next five years.⁹

Assuming standard normality for ε_i gives rise to an ordered probit model¹⁰ which estimates the interesting parameters β and μ_j by maximum likelihood techniques. However, using score tests described by Machin and Stewart (1990), it turned out that the normality assumption is rejected by the data. As the errors are found to deviate in curtosis from a normal distribution, we choose a logistic density, which has a higher peak but declines faster than a normal density (Cramer 1991, p. 15). We thus receive an ordered logit model.

The model yields a fairly good fit as can be seen by the likelihood-ratio test and the percentage of right predictions. The Akaike Information Criterion (AIC) is positive in all cases, i.e. the logit specification yields a better approximation of the data than the probit model. The thresholds μ_j are well determined and significantly different from each other, signifying that the classification in six distinct and ranked categories makes sense. For white-collar workers inferior promotion possibilities for women can be deducted from the much higher ability standards (μ_j) they must meet. In the case of public servants the picture is more irregular: women climb up the first steps of the job ladder more easily than men, but suffer from a "career stop" in middle-management positions.¹¹ Schooling as well as training have a high influence on occupational attainment. In the public sector, experience is not rewarded in the same manner as in private sector jobs, especially for women. Actual working time can be seen as a proxy of effort in the current job. If employees queue for promotion, the signaling of the willingness to supply effort now can be seen as a promise to work long hours in the better job also in the future. As predicted from theory, variables catching the shorter horizon in market work of women (work interruptions and fertility risk) reduce women's advancement.¹²

⁹ For calculation we employed data collected by the Austrian Statistical Office (Demographisches Jahrbuch).

¹⁰ Brown et al. (1980) and Miller (1987) study occupational attainment in a similar context, without having a clear ranking of positions at their disposal.

¹¹ Teachers are better graded from the very beginning.

¹² See Winter-Ebmer and Zweimüller (1991) for a more thorough discussion of the issue of efficient vs. discriminatory promotion in the context of expected length of stay on the job. For the joint determination of promotion and occupational choice see Winter-Ebmer and Zweimüller (1992).

Furthermore, the detrimental impact of expected fertility risk on occupational attainment in the private sector is lower with higher education and job experience.¹³ Two explanations for this phenomenon are possible: i) the desire for having children might be lower for those groups, or ii) advancement consequences are not so severe. Some experimentation with aggregate quit rates – on an occupational or industry level – turned out unsuccessful both for men and women. Coefficients were never significant and often changed signs.

Comparing the results of Table 5 with the wage functions helps to clarify some peculiarities. Periods of home time lead to a career setback for women, but besides that no separate negative impact on wages can be detected. Higher rewards for females from superior hierarchical positions in the wage functions are consistent with different advancement standards by gender: women have to do better than men to be promoted, following human capital theory they get higher money payoffs for *achieved* advancements.

As a first step, occupational attainment differences between men and women can be decomposed into differences due to endowments and such due to coefficients, i.e. discrimination (following (3) and (5) with \bar{G} as average) over individuals:

$$\left(\bar{G} = \frac{1}{N} \sum_{i=1}^N G(\dots) \right)^{14}$$

$$P_{j,m} - P_{j,f}$$

$$= [\bar{G}(\mu_{j+1,m} - \beta_m Z_m) - \bar{G}(\mu_{j,m} - \beta_m Z_m)] - [\bar{G}(\mu_{j+1,f} - \beta_f Z_f) - \bar{G}(\mu_{j,f} - \beta_f Z_f)]$$

$$= [\bar{G}(\mu_{j+1,m} - \beta_m Z_m) - \bar{G}(\mu_{j,m} - \beta_m Z_m) - \bar{G}(\mu_{j+1,f} - \beta_f Z_m) + \bar{G}(\mu_{j,f} - \beta_f Z_m)]$$

... discrimination

$$+ [\bar{G}(\mu_{j+1,f} - \beta_f Z_m) - \bar{G}(\mu_{j,f} - \beta_f Z_m) - \bar{G}(\mu_{j+1,f} - \beta_f Z_f) + \bar{G}(\mu_{j,f} - \beta_f Z_f)]$$

... endowments . (7)

Table 6 presents the results using the estimated parameters of Table 5. Col (1) shows the actual differential, which is decomposed into endowment and discrimination differences in Cols (2) and (3) (B-O-I) as well as (4) and (5) (B-O-II). A positive number indicates that in the respective position men are found in a higher proportion than women, measured in percentage points. In the private sector, women are less represented in the higher ranks (3–5); we are able to explain between a quarter and a third by endowments. The picture is less systematic in the public sector, but the absence of women in the top ranks (4 and 5) is entirely due to discrimination. Given the observed endowment differences we would expect even more women than men in leading public sector jobs.

Extending the decomposition of wage differentials in Sect. 2, we proceed to incorporate effects of unequal promotion schemes. In wage functions where occupa-

¹³ The equation with interaction terms read as follows (*t*-values in parentheses)

-3.21 α_{Ik} + 0.17 school · α_{Ik} + 0.16 exp · α_{Ik} .
 (2.7) (1.6) (2.9)

¹⁴ Due to the non-linear character of the ordered logit model the use of variable means as in Eq. (3) is not possible.

Table 5. Estimates of ordered logit model for professional status (*t*-values in parentheses)

	Private sector		Public sector	
	Males	Females	Males	Females
Constant	-6.285 (11.8)	-6.247 (11.2)	-4.656 (6.5)	-4.138 (3.4)
Years of schooling	0.609 (23.9)	0.748 (27.8)	0.627 (20.4)	0.658 (12.0)
Apprentice training	0.450 (4.6)	0.623 (6.7)	0.261 (2.2)	0.402 (1.8)
Experience	0.052 (3.1)	0.044 (2.5)	0.027 (1.4)	-0.012 (0.3)
Experience ²	-0.0008 (2.3)	-0.0009 (2.2)	0.0001 (0.3)	0.0006 (0.6)
Work interruptions	0.029 (3.1)	-0.018 (2.4)	0.015 (1.3)	-0.030 (1.7)
City size (<2000)				
2-1000	0.256 (2.1)	0.189 (1.5)	0.063 (0.4)	-0.352 (1.1)
10-100000	0.309 (2.1)	0.147 (1.0)	0.200 (1.2)	-0.705 (2.0)
>100000	0.369 (2.7)	0.392 (2.0)	-0.018 (0.1)	-0.813 (2.7)
Married	0.235 (1.8)	-0.111 (1.1)	0.208 (1.3)	-0.134 (0.6)
Children <4 years	0.140 (2.9)	0.027 (0.5)	0.060 (1.1)	-0.061 (0.5)
Weekly working time	0.017 (2.4)	0.011 (1.9)	0.026 (2.0)	0.011 (0.6)
Region (Swiss border)				
West	0.277 (1.7)	0.101 (0.5)	0.504 (2.1)	0.182 (0.3)
Central	0.343 (2.3)	0.059 (0.3)	0.254 (1.1)	0.491 (1.0)
East	0.358 (2.3)	-0.039 (0.2)	0.386 (1.6)	0.114 (0.2)
Foreigner	-0.185 (0.5)	-1.018 (2.8)	1.030 (1.7)	-0.238 (0.4)
Occupation (Seasonal)				
Production	0.283 (1.0)	0.211 (0.6)	-	-
Service	0.653 (2.8)	0.833 (3.3)	-	-

Industry (Manufacturing)					
Mining, construction	0.185 (1.0)	-0.045 (0.2)			
Trade, hotels	-0.779 (6.1)	-0.841 (6.4)			
Transport, energy	-0.681 (4.3)	-0.222 (1.0)			
Finance, insurance	-0.009 (0.7)	0.207 (1.7)			
Other service	-0.709 (9.1)	0.162 (1.3)			
Teacher	-	-	0.380 (2.0)		1.870 (7.2)
Fertility index α_{Ik}	-	-	-		-1.511 (1.8)
μ_1	1.454 (21.6)	2.367 (30.8)	2.441 (16.0)		1.395 (8.5)
μ_2	3.069 (34.6)	5.228 (44.3)	4.652 (27.3)		3.606 (15.0)
μ_3	4.841 (40.0)	7.602 (34.3)	7.351 (35.4)		9.199 (22.4)
μ_4	6.630 (45.8)	10.570 (25.7)	10.374 (31.9)		-
Log L	-2689.3	-2393.0	-1682.7		-516.30
LR-Test	1074.6	1063.30	879.6		469.92
AIC ^a	15.7	21.0	6.2		5.92
% right predictions	37.3	54.2	50.9		62.5
N	1903	2199	1448		571

^a Akaike Information Criterion, Logit vs. Probit:
 $\frac{1}{2} (\text{Log } L_L - M_L) - \frac{1}{2} (\text{Log } L_P - M_P)$, M_L, \dots number of independent variables in Logit or Probit model.

Table 6. Male-female differences in professional attainment

Rank	(1)	(2)	(3)	(4)	(5)
<i>Private sector</i>					
0	- 0.1	-2.1	+2.0	-4.0	+3.9
1	-15.6	-3.0	-12.6	-3.8	-11.8
2	-10.0	-1.6	-8.4	-1.7	-8.3
3	+11.3	+3.1	+8.2	+2.6	+8.7
4	+8.7	+3.1	+5.6	+3.7	+5.0
5	+5.7	+0.5	+5.2	+3.2	+2.5
<i>Public sector</i>					
0	-6.4	+3.8	-10.2	+0.1	-6.5
1	+8.1	+6.4	+1.7	+3.2	+4.9
2	+11.1	+9.3	+1.8	+2.0	+9.1
3	-21.2	-16.5	-4.7	-5.1	-16.1
4	+7.0	-3.0	+11.4	-0.2	+7.2
5	+1.4	*	*	-0.0	+1.4

(1) observed differences, %0-points

(2) differences due to endowments, evaluated at female coefficients

(3) discrimination

(4) differences due to endowments, evaluated at male coefficients

(5) discrimination

* Differential of rank 5 counted in rank 4.

tional positions are included, these positions cannot be taken as exogenously given. Instead, occupational attainment can be decomposed in effects resulting from endowments and discrimination in the usual way, as shown in Table 6. Finally, we arrive at a decomposition of raw wage differentials arising from four sources: endowments vs. discrimination in wage determination as such and wage effects of endowments vs. discrimination originating from the occupational promotion process:

$$\begin{aligned}
 \ln W_m - \ln W_f &= (a_m \bar{X}_m + b_m \bar{P}_m) - (a_f \bar{X}_f + b_f \bar{P}_f) \\
 &= [(a_m - a_f) \bar{X}_m + (b_m - b_f) \bar{P}_m] \dots \text{discrimination in wages} \\
 &\quad + [(\bar{X}_m - \bar{X}_f) a_f] \dots \text{endowments in wages} \\
 &\quad + [\bar{G}(\mu_{j+1,m} - \beta_m Z_m) - \bar{G}(\mu_{j,m} - \beta_m Z_m) - \bar{G}(\mu_{j+1,f} - \beta_f Z_m)] \\
 &\quad + \bar{G}(\mu_{j,f} - \beta_f Z_m) b_f \dots \text{discrimination in promotion} \\
 &\quad + [\bar{G}(\mu_{j+1,f} - \beta_f Z_m) - \bar{G}(\mu_{j,f} - \beta_f Z_m)] \\
 &\quad - \bar{G}(\mu_{j+1,f} - \beta_f Z_f) + \bar{G}(\mu_{j,f} - \beta_f Z_f) b_f \dots \text{endowments in promotion} \quad . \quad (8)
 \end{aligned}$$

In the private sector, 4–6 percentage points of the gender wage differential come from discrimination in professional advancement.¹⁵ A similar result shows

¹⁵ This proportion corresponds to results for the private sector in the UK by Miller (1987) and Dolton and Kidd (1990).

Table 7. Decomposition of wage differentials

	Private		Public	
	B-O-I	B-O-II	B-O-I	B-O-II
<i>Wage determination</i>				
Endowments	-0.035	-0.002	-0.099	0.008
Discrimination	0.317	0.294	0.202	0.099
<i>Promotion effects</i>				
Endowments	0.024	0.037	-0.041	-0.009
Discrimination	0.062	0.039	0.056	0.020
Total differential	0.368	0.368	0.118	0.118

up in the public sector. Here the range in the estimates by the two methods of decomposition is slightly higher: from 2.0 percentage points (B-O-II) to 5.6 points (B-O-I).

The overall picture now shows an even higher part of discrimination. Both in the private and in the public sector endowment differences can account at most for 3.5 points ($-0.002+0.037$) in the case of white-collar private-sector workers (B-O-II). In the public sector the endowment differential either is zero (when females' endowments are rewarded like males', B-O-II) or indicates that women would on average deserve higher pay than their male colleagues (B-O-I). The discrimination component ranges from 0.333–0.379 in the private, and from 0.119–0.258 in the public sector.

5. Conclusions

Using standard decomposition techniques for wages in Austria the following results have been found. Despite the fact that Austria has been a corporatist country and has been ruled by social-democrats for a long time, unexplained wage differentials are found to be on the upper bound of international comparisons. As expected this differential is higher in the private sector, but also in the public sector the discrimination component ranges between 12 and 25 percentage points.

This paper has paid special attention to the analysis of different job levels. On the one hand, we analyze wage differentials within different occupational positions; on the other hand, promotion processes as such are explained by human-capital theory. According to the model by Lazear and Rosen (1990) a shorter time horizon of women in market work will hamper their professional advancement within a firm. According to this theory wage differentials are found to be decreasing with rank in both sectors. Nonetheless, a substantial part of unequal promotion schedules between men and women could not be explained by human-capital differences and differences in expected quit rates. Between the sectors structural differences emerge: Whereas in the private sector women are crowded in lower ranks of the job hierarchy, in the public sector there is no overrepresentation of women at the bottom of the job hierarchy, but women suffer from a career stop from middle management positions upwards.

If discriminatory promotion schemes are incorporated in the analysis of wage differentials, in both private and public sector jobs about 20% of unexplained

wage differentials can be traced back to unequal professional advancement. This study can be seen as a first step in a comprehensive evaluation of equal treatment. Our aim has been to enlarge the analysis of wage discrimination by incorporating sex-specific aspects of job promotion. Further research should encompass other dimensions of non-wage discrimination such as incentive effects of social-security systems, or occupational segregation and educational attainment.

Appendix: Wage functions without professional position (*t*-values in parentheses)

	Private sector		Public sector	
	Males	Females	Males	Females
Constant	4.027 (34.6)	3.629 (33.8)	4.147 (16.8)	4.227 (2.9)
Years of schooling	0.048 (11.0)	0.061 (9.6)	0.051 (5.6)	0.053 (0.9)
Apprentice training	0.021 (1.3)	0.016 (1.0)	0.029 (1.6)	-0.016 (0.2)
Experience	0.032 (12.2)	0.021 (7.6)	0.021 (7.3)	0.019 (2.0)
Experience ²	-0.0005 (9.3)	-0.0002 (3.4)	-0.0002 (3.3)	-0.0002 (1.4)
Work interruptions	0.011 (7.0)	0.0026 (2.6)	0.009 (5.0)	0.005 (1.2)
City size (<2000)				
2-1000	0.004 (0.2)	0.028 (1.4)	-0.002 (0.1)	0.031 (0.4)
10-100000	0.021 (0.8)	0.091 (3.9)	0.028 (1.0)	0.045 (0.5)
>100000	0.042 (1.6)	0.119 (5.2)	0.069 (2.7)	-0.011 (0.1)
Married	0.107 (5.0)	-0.131 (2.2)	0.037 (1.3)	0.076 (0.3)
Children < 4 years	0.062 (8.1)	0.017 (1.8)	0.078 (10.3)	0.036 (0.6)
Weekly working time	-0.014 (10.8)	-0.009 (10.3)	-0.015 (10.1)	-0.024 (14.6)
Region (Swiss border)				
West	-0.060 (2.3)	-0.073 (2.5)	-0.055 (1.5)	-0.065 (0.8)
Central	-0.082 (3.5)	-0.098 (3.6)	-0.035 (1.1)	-0.0003 (0.1)
East	-0.069 (2.8)	-0.042 (1.5)	-0.036 (1.1)	-0.012 (0.2)
Foreigner	0.083 (1.5)	-0.012 (0.2)	0.332 (2.1)	0.045 (0.3)
Occupation (Seasonal)				
Production	0.121 (3.0)	-0.043 (0.7)	-	-
Service	0.160 (4.7)	0.013 (0.3)	-	-
Industry (Manufacturing)				
Mining, construction	0.044 (1.6)	-0.030 (0.8)	-	-
Trade, hotels	-0.069 (3.6)	-0.104 (5.3)	-	-
Transport, energy	-0.083 (3.3)	-0.042 (1.2)	-	-
Finance, insurance	-0.004 (0.2)	-0.0008 (0.1)	-	-
Other service	-0.139 (6.6)	0.013 (0.7)	-	-
Teacher	-	-	0.056 (2.2)	0.104 (3.4)
λ_1	-0.114 (3.1)	-0.013 (0.3)	-0.089 (1.1)	0.129 (0.5)
λ_2	-	0.021 (0.4)	-	-0.155 (0.4)
\bar{R}^2	0.437	0.282	0.448	0.592
SEE	0.298	0.287	0.286	0.278
<i>N</i>	1849	2053	1429	561

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