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Gender Differences in Recruitment Outcomes

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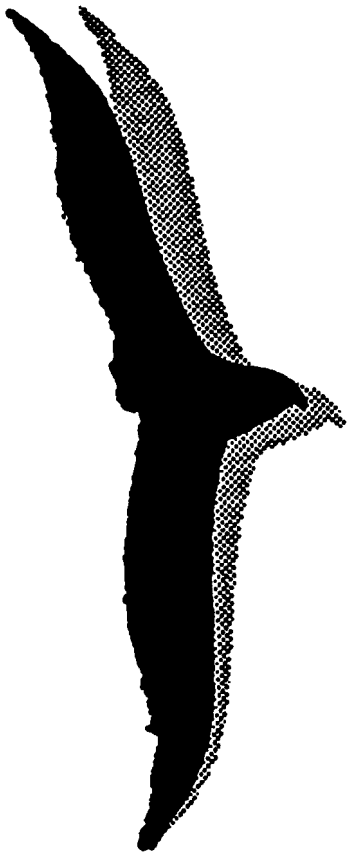

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GENDER DIFFERENCES

IN RECRUITMENT OUTCOMES

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Abstract

Our results indicate that males and females have about the same probability of being hired in a mixed pool of male and female applicants, independently ***of*** *the type* ***of*** *vacancy. The probability* ***of*** *hiring a candidate* ***of*** *a certain sex is therefore determined by the gender composition* ***of*** *the pool* ***of*** *applicants who have selected themselves on the basis* ***of*** *job characteristics, hiring standards and the type of sector.*

1 INTRODUCTION

The segmentation of the labour market and the presence of discrimination are among the most fiercely debated topics in the field of labour economics (see Taubman and Wachter (1986), Cain 1986)). Particularly the gender segmentation of the labour market has been well documented and the presence of an extreme degree of gender segmentation in the labour market is a stylised fact.' The question to which extend this segmentation is voluntary is a politically sensitive issue.*

The results of some studies indicate that gender differences in occupational selection may not be entirely voluntarily, but that women are rationed from particular jobs because of a weaker attachment to the labour force (see Gronau (1988), Lazear and Rosen (1990), Renes and Ridder (1995), Barron et al. (1993). Nevertheless Jones and Makepeace (1996) do not find strong indications of discriminative behaviour of British employers. Since female workers have, on average, a less strong attachment to the labour force, one expects that they behave differently from male workers. For example, the study by Polachek (1981) indicates that female applicants select those occupations in which the depreciation of human capital when out of the labour force is slower. One expects that rational job seekers will apply less often for jobs for which they have lower probabilities of being accepted for jobs paying lower wages or giving less promotion opportunities. For example, if female candidates have lower probabilities of being accepted for permanent jobs, then females will apply less often for these jobs.

In the current paper we will examine which vacancy characteristics determine the gender composition of the pool of applicants. We will also test the hypothesis that the probability of being hired differs for male and female job seekers who have applied for the vacant job. Thus we estimate the probability of hiring a female applicant given the gender composition of the pool. To this end we will use a data set on the employers' recruitment behaviour containing information on the gender composition of the pool of applicants. The advantage of this data set is that one may distinguish between vacancies with perfect gender segregation and vacancies which receive both male and female applicants. Such a distinction is essential because in about 72% of the filled vacancies in the Netherlands perfect segregation occurs.

The outline of this study is as follows. In section 2, we discuss the data and the statistical models employed. In section 3, we analyze which job characteristics determine the degree of gender segregation in the pool of applicants. In section 4, we estimate, firstly, the probability of hiring a female and, secondly, the probability of hiring a female candidate from a pool of applicants. Section 5 concludes.

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[1] See for example Reskin and Hartmann (1986) and Carrington and Troske (1995)).

[2] For example, it is forbidden by Dutch law to express a gender requirement in the announcement of the vacancy. Moreover, in the European Union and in the United States, it is illegal to pay lower wages to females than to males for similar jobs.

2 DATA AND STATISTICAL MODELS USED

The data set used in the present analysis is based upon a survey on the recruitment behaviour of Dutch firms "How do firms recruit?". Firms are randomly selected every two months and interviewed by telephone. The survey covers the period from 1991 to 1994 and it includes detailed information on a flow of about 20.000 filled vacancies. We will analyze the filling of vacancies for which one candidate is hired. After deletion of missing cases and manifest errors, 9033 observations are kept. Each vacancy in the data set is described by the following variables: educational requirements, experience requirements, age limits, number of reactions received, vacancy duration, industrial sector, size of the firm (i.e. the number of employees) and type of job (permanent/ temporary and full-time/part-time). On average, the number of applicants received per vacancy is 14.10 The data set includes information on the gender of all (hired and rejected) applicants in the pool. The 9033 vacancies are filled by 3777 females and 5256 males. The percentage of hired applicants who are female per vacancy is thus 41.8%. The share of female applicants per vacancy is 42.1%.

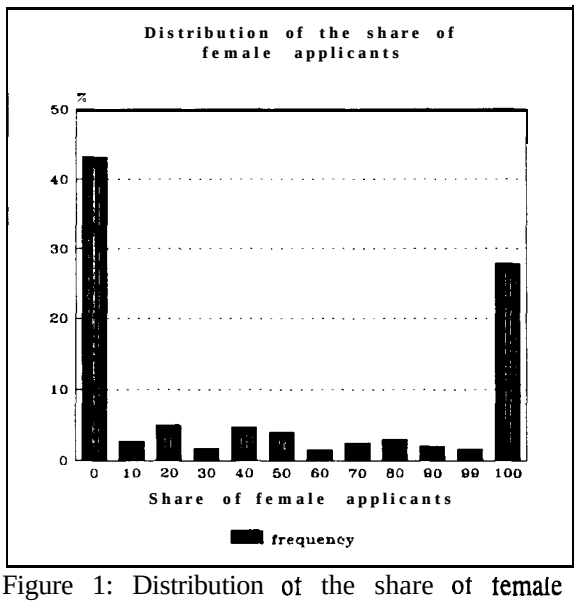

Figure 1: Distribution of the share of female applicants.

As stated in the introduction, in about 72% of all vacancies only females or only males have applied for the job. The frequency table of the share of female applicants is given in Figure 1. In 43% of the cases the pool of applicants consists entirely of male applicants, whereas in 28% the applicants are all female.

The degree of segregation differs among industrial sectors (see Table I). For example, in the construction sector 85% of the vacancies attracts only males, whereas in the service sector 28% of the vacancies attracts only males. It is noted that even in the service sector, where segregation is least common, perfect segregation occurs in 64% of all vacancies. Summarizing, perfect segregation is the norm and not an exception. In section 3, we will investigate which vacancy characteristics determine the gender composi-

tion of the pool of applicants. The gender composition of the pool of applicants is measured by means of the share of female applicants for a given vacancy. This share is a continuous variable on the interval [0,1]. We estimate therefore a two-limit Tobit model with truncation points at 0 and 1 by using maximum likelihood estimation (see Maddala 1985).

Table I: Frequency of the composition of the pool of applicants disaggregated by sector.

	Sector				
	industry	quaternary	services	construction	transport
Composition of the pool in % of the total vacancies					
only male	79.8	34.1	28.2	85.3	52.6
only female	7.5	34.3	35.7	4.3	27.5
perfect segregation	87.3	68.4	63.9	89.6	80.1
male and female	12.7	31.6	36.1	10.4	19.8
number of observations	1407	2371	4061	700	494

The gender composition of the pool of applicants obviously determines the probability that the hired candidate is female. Trivially, in case of perfect gender segregation, the probability of hiring applicants of one sex is determined.

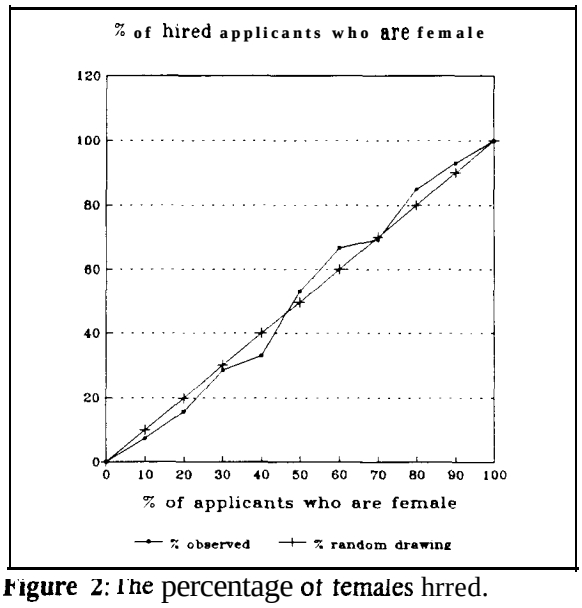

Figure 2: The percentage of females hired.

In Figure 2, the observed percentage of hired applicants who are female is given together with the percentage based on the assumption that the gender of the applicants is irrelevant for employers, i.e. the hired applicants are randomly drawn. The data clearly show that differences are small. This indicates that conditional on applying for a job, the

hiring probabilities of female and male applicants are about equal. In section 4, we estimate the probability of hiring a female by means of a logit model using all 9033 observations (Model I). In addition, we estimate the probability of hiring a female candidate from a *mixed* pool of applicants using 2566 observations (Model II). We therefore exclude vacancies which receive applicants of one gender only.

Define N_i as the number of candidates of gender i, i = m,f, $N_i > 0$. Define S_i as the probability that an arbitrary applicant of a certain gender is hired, i = m,f. This probability of hiring a female applicant given the gender composition of the pool reads then as follows:

$$P(\textit{female candidate is hired} \mid N_f, N_m) = \frac{N_f S_f}{N_f S_f + N_m S_m} \qquad (1)$$

S_i is assumed to be a function of vacancy characteristics x in the following way $S_i = \exp(\theta_i x)$, where θ_i is a vector of parameters to be estimated, i = m,f. In order to obtain identification, we restrict θ_m to be equal to zero. In this way we estimate the effect of exogenous factors on the probability of hiring a female candidate compared to the probability of hiring a male applicant. When one male and female candidate apply for a vacant position ($N_f = 1$, $N_m = 1$), we obtain the familiar logit model.

3 THE SHARE OF FEMALE CANDIDATES

The estimates of the two-limits Tobit model for the share of female candidates applying for the vacant position are presented in Table II. These estimates can be thought of as the result of supply side preferences for certain occupations together with the anticipation of employers' hiring behaviour.

Job characteristics. We find that permanent jobs attract fewer female candidates. A plausible explanation is that the applicants' productivity is linked to a continuous participation in the labour market. Women, who drop more regularly out of the labour force, may perceive their hiring probability as being low (see Renes and Ridder (1995) and may therefore apply less. Somewhat surprisingly, we find that full-time jobs are equally attractive to males and females. Our finding that large firms attract less female candidates may be explained in the light of the results of Barron et al. (1989). Generally firms screen more applicants for positions requiring more training. Since these positions are more numerous in large firms (Barron et al. 1987), large firms prefer applicants who stay with the firm for a long period in order to collect the yields from the investment in training. Since applying is costly, female candidates who are more likely to leave the potential employer would anticipate the (perceived) preference of the employer and would therefore apply less often.

Hiring standards. Positions requiring a general secondary education usually receive a larger share of female applicants. The contrary appears to hold for position requiring high educational requirement. 'Specific experience' requirements and 'age limits' decrease the share of female applicants. Workers with a lower quit probability tend to be concentrated in positions offering more training (see Barron et al. (1993)). As a result, women may (voluntarily) sort themselves into position requiring less training.

Table II: Maximum likelihood estimates of the share of female applicants (Standard errors between parenthesis; *: significant at 5%).

	Dependent variable: percentage of female applicants
	Model: Two-Limits Tobit model
Independent variables	
constant	1.14 (0.17)*
Job characteristics	
permanent	-0.30 (0.03)*
full-time	0.05 (0.04)
firm's size(/100)	-0.02 (0.01)*
Hiring standards	
Educational requirements	
university	-0.30 (0.06)*
secondary general	0.63 (0.08)*
secondary vocational	0.03 (0.06)
primary vocational	-0.05 (0.06)
specific experience	-0.26 (0.03)*
age limit	-0.15 (0.03)*
Sector	
industrial	-1.47 (0.05)*
quaternary	-0.01 (0.03)
construction	-1.74 (0.07)*
transportation	-0.55 (0.06)*
Economic conditions	
regional unemployment	-0.01 (0.01)
# vacancies/employment(*10)	0.46 (0.69)
Years and bimonthly waves	
1992	0.06 (0.06)
1993	0.11 (0.07)
1994	0.09 (0.07)
w2 (March-April)	-0.08 (0.05)
w3 (May-June)	-0.11 (0.05)*
w4 (July-August)	-0.07 (0.05)
w5 (September-October)	0.00 (0.05)
w6 (November-December)	-0.01 (0.05)
variance	1.12 (0.02)*
# of observations	9033
Log Likelihood full model	-6139.57

Reference groups of the independent variables are given between brackets: year (1991), wave (w1 January-February), economic sector (services), educational requirements (primary), experience requirements (no experience requirements), age limit (no age limit), permanent position (temporary position), full-time job (part-time job).

Sector. The industrial, construction, and transportation sectors receive less female

applicants than the other sectors. Industry, construction, and transportation sectors are the economic sectors where usually more physical strength is needed. In addition, the working patterns are usually such that the combination of this type of work with household duties may be problematic (for example, night shifts, or in the case of the transportation sector the possibility of long distance trip abroad).

Economic conditions and bimonthly waves. The economic conditions do not affect the share of the female candidates. Notice there is a positive (but insignificant) increase in the share of female participants over time, which may be related to the increasing participation degree of females in the Netherlands.

In summary, we find that job characteristics, hiring standards and the sector strongly affect the share of female candidates. The economic conditions have no effect however.

4 THE PROBABILITY OF HIRING A FEMALE AND THE PROBABILITY OF HIRING A FEMALE CANDIDATE FROM A POOL OF APPLICANTS

The estimates of the logit model describing the probability of hiring a female are presented in Table III, column 2 (Model I); the estimates of the model describing the probability of hiring a female candidate from a pool of applicants, as modelled in (1), are presented in Table III, column 3 (Model II). In the latter model, we use the 2566 vacancies that received applicants of both genders.

A striking result of model I is that the significant coefficients of variables in Model I have the same sign as those variables in the model which explain the share of female applicants in the pool (see section 3). For example, in the construction sector, the share of female candidates is low and probability of hiring a female are low. This implies that the probability of hiring a female is determined by the same factors which determine the share of females in the pool.

The estimates of the model of the probability of hiring a female candidate from a pool of applicants (Model II) also lend support to our conclusion that the probability of hiring a female is largely determined by the share of female candidates in the pool since we find that the variables which have a significant effect in model I are mostly insignificant in Model II. For example, in the construction sector female candidates have the same probability of being hired as male candidates conditional on the application. We employ therefore a Likelihood Ratio-test to test the hypothesis that the overall effect of the variables, except the constant, is insignificant. We find that we cannot reject the hypothesis that the overall effect of all variables included is null (LR(23) = 28.21 < χ^2 (23); χ^2 **(23)** is 35.2 at 5% level). [3] Hence, there is no support for a systematic variation in the hiring probabilities of female and male applicants who have applied for a job.

[3] The results weakly indicates however that experience requirements lower the probability of hiring female applicants and that in the quaternary sector female candidates have lower probabilities of being hired. The latter result is remarkable. In the Dutch public sector, the female candidate must be hired in case the best two candidates are a male and a female and are equally suitable. Notice nevertheless that the LR-test indicates that the overall effect of all explanatory variables is insignificant.

Table III: Logit estimates of the probability of hiring a woman (Model I) and of the probability of hiring a female applicant (Model II) (Standard errors between parenthesis; *: significant at 5%).

	Dependent variable: probability of hiring a female Model I		Dependent variable: probability of hiring a female applicant Model II	
Independent variables				
constant	0.94	(0.28)*	0.56	(0.61)
Job characteristics				
full-time	0.07	(0.06)	0.02	(0.14)
permanent	-0.54	(0.06)*	-0.19	(0.12)
firm's size(/100)	-0.04	(0.01)*	0.01	(0.02)
Hiring standards				
Educational requirements				
university	-0.49	(0.11)'	0.50	(0.28)
secondary general	1.13	(0.14)*	0.61	(0.32)
secondary vocational	0.05	(0.10)	0.33	(0.28)
primary vocational	0.02	(0.10)	0.18	(0.28)
specific experience	-0.45	(0.06)'	-0.27	(0.12)*
age limit	-0.28	(0.06)'	-0.07	(0.11)
Econanic sector				
industrial	-2.29	(0.09)*	-0.37	(0.20)
quaternary	-0.01	(0.06)	-0.24	(0.12)*
construction	-2.69	(0.15)*	0.22	(0.29)
transportation	-0.78	(0.10)*	0.09	(0.29)
Economic conditions				
regional unemployment	-0.01	(0.02)	-0.03	(0.04)
# vacancies/employment(*10)	0.06	(1.19)	-0.16	(0.24)
Years and waves				
1992	0.10	(0.10)	-0.14	(0.20)
1993	0.19	(0.13)	-0.29	(0.27)
1994	0.19	(0.12)	-0.10	(0.26)
w2 (March-April)	-0.10	(0.08)	0.09	(0.17)
w3 (May-June)	-0.12	(0.09)	0.11	(0.18)
w4 (July-August)	-0.12	(0.08)	0.01	(0.17)
w5 (September-October)	-0.03	(0.08)	0.07	(0.16)
w6 (November-December)	-0.07	(0.08)	0.31	(0.17)
# of observations	9033		2566	
Log Likelihood only constant model	-5205.47		-1248.20	
Log Likelihood full model	-6139.57		-1234.10	

Reference groups of the independent variables are given between brackets: year (1991), wave (w1 January-February), economic sector (services), educational requirements (primary), experience requirements (no experience requirements), age limit (no age Limit), permanent position (temporary position), full-time job (part-time job).

This result suggests that the hiring probabilities of female and male applicants are equal. We test therefore the hypothesis that the probability of being hired differs between

male and female job seekers who have applied for the vacant job. To this end we employ again a Likelihood Ratio-test to test the hypothesis that the overall effect of the variables including the constant is insignificant. We find that this hypothesis is just rejected at the 5% level (LR(24) = 38.53 < χ^2 (24); χ^2 (24) is 36.4 at 5% level), whereas it is not rejected at lower significance levels (for example, χ^2 (24) is 39.4 at the 2.5 % level). Given the large data set, it seems justified to conclude that male and females have equal probability of being hired.[4] We conclude therefore that the probability of hiring a female is largely determined by the share of females in the pool. What we actually find is that the probability of hiring a female is slightly ***higher*** than the probability of hiring a male candidate. We find that the probability of hiring a female from a pool of candidates equals 0.53 (the standard deviation is 0.01).[5] We may therefore reject the hypothesis that females have a lower probability of being hired from a pool of applicants.

In conclusion, our results indicate that males and females have equal probability of being hired conditional on having applied for a job. The probability of hiring a candidate of a certain gender is therefore determined by the gender composition of the pool of applicants who have selected themselves on the basis of job characteristics, hiring standards and the type of sector.

We emphasise that our results do not contract the claims of other studies mentioned in the introduction that some forms of gender discrimination are prevalent in the labour market. Nevertheless our results may be interpreted as a sign that job seekers will take such discriminatory behaviour into account such they have equal probabilities of being hired. For example, suppose that hiring standards are higher for females than for males (Renes and Ridder (1995)). As a consequence, male applicants will have higher probabilities of being accepted, ceteris paribus. As we found that males and females have equal probabilities of being hired conditional on having applied, this implies that particularly females who are overqualified compared to males will apply. More effort therefore should be devoted to understand which are the determinants of the decision to apply by male and female applicants.

5 CONCLUSION

In this paper, we find no support for a systematic variation in the hiring probabilities of female and male applicants who have applied for a job. The results indicate also that males and females have about the same probability of being hired conditional on applying, independently of the type of vacancy. The probability of hiring a candidate of a certain sex is therefore determined by the gender composition of the pool of applicants who have selected themselves on the basis of job characteristics, hiring standards and the type of

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[4] We realize that our estimation procedure may be (slightly) biased since model I and II do not allow for omitted heterogeneity between the firms (for example, some firms may provide free child care) which is an underlying assumption of the logit model (model I) and model II, see Maddala (1983). We re-estimated therefore model I and II including the variance of an omitted unobserved variable (Kettunen (1995)). We found however identical results to those presented here (the variances of the omitted unobserved variable do not differ significantly from zero).

[5] This result has been obtained by estimating the model including the constant only. The standard deviation has been calculated using the delta method (Goldberger 1991).

sector.

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