

# A Little Less Discrimination? Anonymous Job Applications of Fresh Ph.D. Economists\*

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## **Abstract**

Discrimination in recruitment decisions is well documented. Anonymous job applications may reduce discriminatory behavior in hiring. This paper analyzes the potential of this approach in a randomized experiment with fresh Ph.D. economists on the academic job market using data from a European-based economic research institute. If included in the treatment group, characteristics such as name, gender, age, contact details and nationality were removed. Results show that anonymous job applications are in general not associated with a higher or lower probability to receive an invitation for a job interview. However, we find that while female applicants have a higher probability to receive an interview invitation than male applicants with standard applications, this difference levels with anonymous job applications. We furthermore present evidence that certain professional signals are weighted differently with and without anonymization.

**Keywords:** Ph.D. economists; annual job market; discrimination; anonymous job applications; randomized experiment

**JEL Classification:** J44; J79; J20

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# 1 Introduction

Individuals from minority groups face discrimination in several forms and in several markets. Discrimination manifests for example in the umpires' evaluation of Major League Baseball pitchers (Parsons et al., 2011), but it is also documented in a wide range of consumer markets such as the market for new cars (e.g., Ayres and Siegelman, 1995) or the housing market (e.g., Ondrich et al., 2003; Bosch et al., 2010).<sup>1</sup> Nevertheless, the labor market is presumably the most important market in which discrimination is present. The vast body of the literature that aims at identifying, measuring and decomposing the gender wage gap supports this view (see, e.g., Weichselbaumer and Winter-Ebmer, 2005, for a meta-study). However, employers' discriminatory behavior in the labor market may not only affect wage setting, it may be already present in the hiring process.

From a theoretical point of view, firms should hire the most productive workers—no matter where they are from, what gender they have, or which ethnic group they belong to. Discrimination is a market failure, and it is costly to the firms. For example, Weber and Zulehner (2009) show that firms with strong preferences for discrimination, i.e., a low share of female employees relative to the industry average, have significantly shorter survival rates. On the other hand, there are numerous empirical studies that find a substantial extent of discrimination in the hiring decisions of firms. Examples of such studies that typically use correspondence tests include Bertrand and Mullainathan (2004) for the United States, Carlsson and Rooth (2007) for Sweden, and Kaas and Manger (2010) for Germany.

Discrimination as a market failure provides the basis for policy interventions of various kinds. One intervention, which has recently gained attention and popularity, are anonymous job applications. The intuition is straightforward: removing information about characteristics that employers may discriminate against should reduce or even abandon discrimination in hiring. Discrimination becomes virtually impossible, at least in the first stage of the hiring process which is the decision about the invitation for a job interview. To test whether the desired effects result in practice, several European countries have recently conducted experiments with anonymous job applications (e.g., France, the Netherlands, and Germany). Empirical results are not yet available for the majority of these experiments—with one exception: Aslund and Nordström Skans (2007) analyze an experiment conducted in parts of the local administration in the Swedish city of Gothenburg. Based on a difference-in-differences approach, the authors find that anonymous job applications increase the chances of being invited to a job interview for both women and applicants of non-Western origin when compared to standard applications. These increased chances in the first stage also translate into a higher job offer arrival rate for women, but not for migrants.

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<sup>1</sup>See Yinger (1998) for an overview about discrimination in consumer markets.

Our paper adds to the literature on the effects of anonymous job applications and to the literature on the job market for fresh Ph.D. economists. While the data used in the latter literature is fairly old, we use fresh data from an own randomized experiment.<sup>2</sup> Participants in our experiment are economists who are close to finishing or have recently finished a Ph.D. degree (or equivalent). During the North American annual job market for economists 2010/2011, they applied for a position as a post-doctoral researcher at a European-based economic research institute. Because the treatment was randomly assigned in the experiment, we can rule out any selection into treatment status.

We expect that the introduction of anonymous job applications reduces the extent of discrimination in hiring. Discrimination becomes impossible if the anonymization is effective. Nevertheless, to result in any effects, it is required that discriminatory behavior is present before the introduction of anonymous job applications. One may, however, question that this holds in our specific context. First, discrimination may be lower for high-skilled occupations (including Ph.D. economists). This view is supported, e.g., in Carlsson and Rooth (2007). Second, discrimination may be lower in international labor markets. This argument is related to the previous point and manifests for example in the fact that English is the common language (or *lingua franca*) in economic research. Third, discrimination may be lower in more competitive labor markets (Weber and Zulehner, 2009), and there is evidence that the particular labor market that we study is rather thick (Coles et al., 2010). These three arguments support the view that discrimination in hiring may not be very prevalent in the annual job market for Ph.D. economists, and that the effects of anonymous job applications may thus be limited in our context.

This paper is organized as follows. Section 2 gives an overview about the annual job market for Ph.D. economists and highlights some important features. Section 3 describes our experimental design and gives an overview about the data. We present and discuss our results in Section 4. Finally, Section 5 concludes.

## 2 The Job Market for Ph.D. Economists

The job search process for economists who are close to finishing or have just recently finished their Ph.D. (or equivalent) is rather exceptionally structured.<sup>3</sup> Mainly academic institutions, but also government agencies and private firms stand on the demand side. The applicant screening process is an annual procedure. It typically

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<sup>2</sup>Our study is therefore similar to Goldin and Rouse (2000) who also analyze anonymous job applications in a particular labor market. They find that the introduction of “blind” auditions to select members of symphony orchestras increases the chances of female musicians to be hired.

<sup>3</sup>Cawley (2011) serves as a very comprehensive overview and guideline for young economists who plan to participate in the job market.

ranges from September to February, and it is structured in three steps.<sup>4</sup>

The first step takes place in early fall. At this stage, vacancies for Ph.D. economists are posted in the monthly issues of Job Openings for Economists (JOE) and on several other websites (Coles et al., 2010). Candidates send their applications to potential employers, who then decide which applicants they would like to interview. The second stage takes place at the Allied Social Science Association (ASSA) meetings in January, where candidates and employers meet for interviews. The interview dates are set up in advance and interviews take place, e.g., in hotel rooms, in suites, or at tables in large ballrooms.<sup>5</sup> In a third step, the most convincing candidates are invited to visit the institutions and present their research. These visits are typically scheduled between January and March. Job offers are also communicated during this period. Coles et al. (2010) argue that the number of doctorates awarded from academic institutions and the number of academic and non-academic job vacancies result in a rather thick market. Candidates who receive their Ph.D. from universities other than those based in the United States participate in this job market, too. On the demand side, also institutions which are based outside the United States participate.

The literature on the job market mainly concentrates on the United States. Most studies are concerned with certain determinants of the application process and the supply and demand side in the market, where empirical evidence dates back to the 1980s. These studies analyze the relationship between the applicant's professional characteristics, other socio-demographic factors and interview decisions or job offers. Other studies investigate heterogeneous demand side effects, such as differences in hiring practices between higher-ranked and lower-ranked departments, or they compare the hiring decisions of academic and non-academic employers.

For example, Taube (1987) analyzes the relationship of applicant characteristics on outcomes such as interview invitations, site visits and job offers with survey data from the ASSA meetings in 1987. He finds that males have fewer academic interviews than females, and that the number of publications is significantly positive related with site visits. Moreover, the number of interviews and site visits as well as the number of site visits and job offers are positively related. Similar effects of the number of research papers on the interview decision are documented in Carson and Navarro (1988), who analyze survey data from economic departments in the 1985/1986 job market. They additionally find that the candidate's presentation at the campus visit and the future research agenda are important determinants of a successful job search. In addition, they investigate differences in hiring practices

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<sup>4</sup>The following description focuses on the *primary job market*. See Carson and Navarro (1988) for an additional illustration of the *preemptive job market* and the *secondary job market*.

<sup>5</sup>About 600 hotel rooms or suites and 150 tables have been booked recently for interviews (Coles et al., 2010).

between the top 20 economic departments and other economic departments.<sup>6</sup> The use of networks to find candidates and the candidate's research rather than teaching skills are more important for the top departments. At the same time, they require less teaching activities and offer higher base salaries.

Barbezat (1992) uses a database of Ph.D. economists who searched for a job in the 1988/1989 job market. She investigates the importance of the rank of the economic department from the applicant's side and finds that a higher ranking of a potential employer increases the probability that the applicant accepts a job offer from that employer. She furthermore finds that different gender preferences for the time attributed to teaching and research activities, the salary and other benefits, and the collegiality are able to explain that women are more likely to accept a job at liberal arts colleges compared to top-ranked universities. The results concerning the rank of the departments are confirmed by Stock et al. (2000) who use survey data of job candidates and academic departments which recruited economists in the job market in 1995/1996. In addition, they find that candidates who receive a Ph.D. from a higher-ranked department tend to have more interviews and job offers.

List (2000) focuses on interview decisions and compares academic and non-academic institutions in this regard. He analyzes survey data from first-time job seekers at the ASSA meetings in 1997. He finds that the interview decision of academic departments—as opposed to non-academic employers—is based on research publications of the candidates, a completed Ph.D. from one of the best 19 institutions and reference letters from prestigious economists. Moreover, women receive slightly more academic interview invitations, but less interview invitations in the non-academic market. Among the socio-demographic characteristics of the applicant, only age plays a statistically significant role for the interview decision, which is negative. List (2001) presents additional results based on similar data. He concludes that gender, age, ethnic background, and citizenship are determinants of the interview decision. Nevertheless, a candidate can influence the probability of receiving an interview invitation by maintaining quality teaching and research portfolios. He furthermore identifies networking as an important factor of success. His estimates suggest that recommendation letters from eminent economists significantly increase the number of interview invitations. Mixon and Trevino (2005) analyze factors that influence whether an individual academician holds a named professorship. Their results support the presence of gender discrimination. Female economists have a 7.6 percentage point disadvantage relative to their male counterparts regarding the likelihood of holding a named professorship in the United States.

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<sup>6</sup>Carson and Navarro (1988) determine the top 20 economic departments through recent rankings. In their case, they include Chicago, Columbia, Cornell, Harvard, Johns Hopkins, MIT, Michigan, Minnesota, NYU, Northwestern, Pennsylvania, Princeton, Rochester, Rutgers, Stanford, UC-Berkeley, UC-Los Angeles, UC-San Diego, Wisconsin, Yale.

To summarize, the literature generally agrees that the most important determinants of interview and hiring decisions in the job market for high-skilled economists are professional signals of the applicant. These signals include the number of research papers and publications, the time to complete the Ph.D. degree, and the university which the degree is obtained from. However, some studies suggest that the probability of receiving an interview invitation increases (or decreases) depending on gender, age, or ethnic background. This gives rise to the question whether such potentially different treatments are still present when these characteristics are not known to the recruiters, i.e., when anonymous job applications are introduced.

### 3 Experimental Design and Sample

Our experiment took place at a European-based economic research institute during the annual job market 2010/2011. Vacancies for positions as a post-doctoral researcher were posted in two monthly issues of the JOE (October and November 2010). 148 applications were screened in November and December 2010 and 26 candidates were invited for an interview at the ASSA meetings in January 2011. Because of data protection laws, our sample size decreases from the originally 148 applicants to 96 individuals.<sup>7</sup> When we additionally exclude observations with missing information about age and citizenship, our final sample consists of 82 individuals.

The treatment status was randomly assigned in our experiment. We can therefore rule out any selection into treatment group and control group. If included in the treatment group, the applicant's name, contact details, age, nationality, gender and any other indications of the candidate's identity were overwritten with correction fluid. The anonymous job applications had to be photocopied then before handing them to the recruiters, since in most cases the correction fluid did not cover the respective text entirely. The anonymization was done by experienced staff members who were otherwise not involved in the hiring process. This method of anonymizing applications did not prove to be very efficient in past international experiments. However, since recommendation letters are an important determinant in the application process (List, 2000, 2001) and no serious alternative method was available to anonymize continuous text documents, it was decided to carry out the anonymization as described. The screening process of the applications was conducted as in the previous years by a hiring committee consisting of four members.

Table 1 displays descriptive statistics for our treatment and control groups, i.e., the two groups with anonymous and non-anonymous job applications. It becomes apparent that the randomization was indeed successful as any differences between the two groups are not statistically significant. About 20 percent of the sample

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<sup>7</sup>Participants in the experiment are required to give us permission to use their data.

receive an interview invitation, where the probability for the group with standard applications is slightly higher than for the group with anonymous job applications. About 35 percent of the applicants are female and the average age is around 30 years. Roughly 30 percent of the candidates have a non-Western background and have written in total (working papers and publications) between four and five papers. The average number of papers published in A/A+ journals is below one paper in both groups. Among those applicants who graduate from a top university, the average university rank is around 90, where there are 268 ranks in total. About 25 percent of the entire sample receive their Ph.D. degree from one of the top 20 universities. Although this number differs between treatment and control group, the difference is not statistically significant. On average, the applicants started their Ph.D. program about five years ago and less than 20 percent already hold their Ph.D. degree when they apply. Few applicants have work experience outside academia.

The distribution of applicants' characteristics is therefore similar to Barbezat (1992), except that the fraction of women is higher in our sample. This is also the case when we compare our sample to most other samples in the related literature, but it is very likely related to the increasing number of female Ph.D. economists over time—and most other studies use data from more than ten years ago. Another difference to related studies is that we observe a relatively low fraction of applicants from the top 20 departments. But given that most of these departments are based in the United States, and that most applicants who receive their Ph.D. in the United States also apply for a post-doctoral position in this region, it comes as no surprise that applicants from these departments appear more often in North American data.

## 4 Results

Table 2 displays the results for the baseline probit regressions, where the dependent variable equals 1 if an interview invitation is received and 0 otherwise.<sup>8</sup> Socio-demographic characteristics, professional signals and interaction terms between anonymized characteristics and treatment status are added sequentially to the specifications, see columns (1) to (4). The first column displays the raw difference in the invitation probability between applicants with standard and anonymous job applications. This difference is not statistically different from zero, as shown before, and it remains statistically insignificant when we include additional control variables. Anonymous job applications themselves therefore do not have an impact on the interview decision. In columns (2) and (3), we additionally include socio-demographic and professional characteristics. Age has an inversely U-shaped effect on the prob-

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<sup>8</sup>When we estimate these regressions without age, and we therefore gain 11 additional observations, our results do not substantially change.

ability of receiving an interview invitation, but being female or whether one has a non-western background does not significantly influence the recruiters' decision. The longer a candidate needs to finish the Ph.D. degree, the lower is the interview probability, which has also been shown by Barbezat (1992). Having some work experience outside academia has a significantly positive effect. This could be explained by the orientation of the research institute because it is not only an academic institution, but also serves as a place of communication between academic science and political practice.

To identify whether anonymous job applications have a different effect on certain social groups, we add interaction terms between the treatment status and socio-demographic characteristics in column (4). Interestingly, the coefficient estimate on the interaction term between anonymous job applications and female applicants is significantly negative. On the other hand, the coefficient estimate for female applicants becomes significantly positive. The sum of these two estimate is virtually zero. This indicates that a) with standard applications, female applicants are more likely to receive an interview invitation relative to their male counterparts, and b) this relative advantage levels with anonymous job applications. A story that is consistent with this finding is that female candidates are generally favored in the hiring process, but when this information is not available, such (positive) discrimination is not possible anymore.

Another channel through which differential effects between anonymous and non-anonymous groups may arise are professional signals. One could imagine that these signals might receive a different weight when screening an anonymous application and not knowing the identity of the applicant as compared to the regular screening of a standard application.

Table 3 displays the results of probit regressions in which interaction terms between the different professional characteristics and the treatment status are included. We again sequentially include additional control variables in columns (1) and (2). These results basically mirror our previous findings. In column (3), we include the interaction terms of interest. Our results confirm the hypothesis that certain characteristics of the applicant which are related to his or her education or research portfolio are treated differently under anonymous job applications. This holds true both for the number of publications in A/A+ journals as well as for having obtained a Ph.D. degree from a top 20 university. Whereas these signals have a significantly negative effect on the invitation probability with standard applications, their effect is at least significantly less negative with anonymous job applications.

The negative effect of top publications and graduates from top universities with standard applications may appear surprising at first sight, but it can be explained as follows. The hiring institution does research and policy advice at a high international level and therefore needs research staff of high quality. However, it is known



that applicants from the very top universities in the United States and those with a very high publication record are unlikely to finally accept a job offer at that institute and, therefore, the hiring committee may not find it efficient to invite those applicants for an interview. This bias disappears with anonymous job applications. An explanation is that the recruiters rely more strongly on “traditional” quality signals when confronted with such applications.

This has interesting implications for anonymous job applications in general. One might have to take into account not only the potential positive side of concealing certain socio-demographic characteristics, that is to reduce discrimination, but also that other characteristics which are always known to the recruiter might be weighted (maybe unconsciously) differently. This may, however, have positive or negative consequences for the applicants.

## 5 Conclusions

This study presents empirical evidence on the effects of anonymous job applications in a particular labor market, namely the annual job market for Ph.D. economists. We analyze a randomized experiment conducted among applicants for a post-doctoral research positions at a European-based economic research institute in 2010/2011. In case of treatment assignment, certain characteristics of the applicant, such as name, gender, age, contact details and nationality, were removed from the applications.

Our empirical analysis shows that anonymous job applications are in general not associated with a higher or lower probability to receive an invitation for a job interview. However, when we investigate the effect for different groups, we find that while female applicants have a higher probability to receive an interview invitation than male applicants with standard applications, this difference levels with anonymous job applications. This finding may be related to the fact that female researchers are favored in this segment of the labor market to promote their chances in research and academia. There is evidence that women’s chances are still lower than men’s opportunities (Mixon and Trevino, 2005). Such positive discrimination of female economists is obviously not possible with anonymous job applications as the applicants’ gender is unknown. Our results moreover indicate that certain professional signals of the applicants are weighted differently with and without anonymous job applications. We find evidence that the institute’s recruiters rely more strongly on “traditional” quality signals such as journal publications and university rankings when they are confronted with anonymous job applications. These signals even have a negative effect with standard applications, which can be explained by a strategy of the institute to maximize the job offer acceptance rate in a later stage. The recruiters may not find it efficient to invite candidates for an interview which

belong to the target group of the very top universities (in the United States). They will likely accept a job offer from these competing institutions.

The important question to be answered in the long run is whether and whom anonymous job applications serve with their initial purpose, that is to reduce discrimination and to increase the chances of disadvantaged groups in the labor market. Our findings indicate that certain groups may even be hindered in their job chances by hiding their identity. Moreover, other characteristics, which are known to the recruiter in any case, may be taken into account more strongly, or at least differently, when screening the anonymous job applications. This effect can result in ambiguous outcomes for the applicants. It is *a priori* difficult to judge the direction because the interpretation of information is context-specific, and the introduction of anonymous job applications broadly changes the informational context. Whether anonymous job applications are implemented should therefore depend on the characteristics of a particular, narrowly defined labor market. For example, it appears important to take into account the extent of discrimination as well as the specific characteristics of the hiring process in the given labor market.

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Table 1: Descriptive Statistics

	Non-Anonymous	Anonymous	t-test
Interview invitation	0.244 (0.435)	0.171 (0.381)	0.811
Female	0.341 (0.480)	0.366 (0.488)	-0.228
Non-western origin	0.293 (0.461)	0.268 (0.449)	0.243
Age	30.78 (3.158)	29.95 (2.747)	1.269
Number of papers	4.366 (3.352)	4.610 (2.862)	-0.354
Number of publications in A/A+ journals	0.073 (0.461)	0.195 (0.511)	-1.266
Ph.D. degree from top university – rank	94.39 (71.216)	84.49 (73.294)	0.546
Ph.D. degree from top 20 university	0.171 (0.381)	0.293 (0.461)	-1.306
Years to complete Ph.D.	5.000 (1.285)	4.707 (1.167)	1.080
Holding Ph.D. degree at time of application	0.146 (0.358)	0.171 (0.381)	-0.299
Work experience	0.122 (0.331)	0.049 (0.218)	1.181
# Observations	41	41	

*Source:* Own experimental data.

*Notes:* Standard deviations are in parentheses. Non-western origin is defined as having citizenship from an African, Asian, Latin American, or Eastern European country. A/A+ journals are defined according to the Handelsblatt journal ranking. Top universities are defined as the top 5% institutions listed by RePEc in July 2011 and include 268 ranks. The average of the top university's rank is only available for 65 observations. Top 20 universities include: Harvard, University of Chicago, MIT, LSE, UC-Berkeley, Princeton, Oxford, New York University, Columbia University, Stanford University, Barcelona Graduate School of Economics, Toulouse School of Economics, Boston University, Yale, Northwestern, University of Pennsylvania, University of Michigan, Paris School of Economics, UC-San Diego, and Brown.

Mean difference: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 2: Probit Regressions I

	(1)	(2)	(3)	(4)
Anonymous	-0.073 (0.089)	-0.056 (0.089)	-0.029 (0.086)	0.124 (0.104)
Female		0.117 (0.086)	0.129 (0.082)	0.297 (0.107)***
Anonymous×Female				-0.383 (0.136)***
Non-western origin		-0.020 (0.09)	-0.030 (0.089)	-0.007 (0.123)
Anonymous×Non-western origin				0.038 (0.176)
Age		1.067 (0.477)**	1.158 (0.523)**	1.131 (0.48)**
Age squared		-0.017 (0.008)**	-0.019 (0.009)**	-0.018 (0.008)**
Number of publications in A/A+ journals			0.052 (0.081)	0.032 (0.085)
Ph.D. degree from top 20 university			-0.092 (0.098)	-0.128 (0.094)
Years to complete Ph.D.			-0.065 (0.034)*	-0.058 (0.032)*
Holding Ph.D. degree at time of application			-0.206 (0.149)	-0.248 (0.149)*
Work experience			0.284 (0.133)**	0.250 (0.124)**
# Observations	82	82	82	82
Log Likelihood	-41.516	-37.532	-34.619	-32.166

Source: Own experimental data.

Notes: Probit regressions. Average marginal effects. Robust standard errors in parentheses. Dependent variable is equal to 1 if individual was invited for an interview. See Table 1 for additional notes.

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.

Table 3: Probit Regressions II

	(1)	(2)	(3)
Anonymous	-0.050 (0.086)	-0.029 (0.086)	-0.628 (0.361)*
Female		0.129 (0.082)	0.142 (0.086)*
Non-western origin		-0.030 (0.089)	-0.060 (0.099)
Age		1.158 (0.523)**	1.245 (0.468)***
Age squared		-0.019 (0.009)**	-0.020 (0.008)***
Number of publications in A/A+ journals	0.028 (0.091)	0.052 (0.081)	-0.592 (0.139)***
Anonymous×Number of publications in A/A+ journals			0.709 (0.18)***
Ph.D. degree from top 20 university	-0.041 (0.103)	-0.092 (0.098)	-0.377 (0.18)**
Anonymous×Ph.D. degree from top 20 university			0.359 (0.219)
Years to complete Ph.D.	-0.039 (0.035)	-0.065 (0.034)*	-0.124 (0.047)***
Anonymous×Years to complete Ph.D.			0.115 (0.071)
Holding Ph.D. degree at time of application	-0.255 (0.134)*	-0.206 (0.149)	0.166 (0.219)
Anonymous×Holding Ph.D. degree at time of application			<i>omitted</i>
Work experience	0.287 (0.141)**	0.284 (0.133)**	0.345 (0.192)*
Anonymous×Work experience			<i>omitted</i>
# Observations	82	82	74
Log Likelihood	-38.655	-34.619	-30.285

Source: Own experimental data.

Notes: Probit regressions. Average marginal effects. Robust standard errors in parentheses. Dependent variable is equal to 1 if individual was invited for an interview. Omitted coefficients predict failure or success of the dependent variable perfectly and are left out of the regression. The number of observations therefore decreases to 74 in column (3). See Table 1 for additional notes.

\*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.