The B.E. Journal of Economic Analysis & Policy

Advances

Volume 6, *Issue* 2 2006 *Article* 1

FIELD EXPERIMENTS

An Experimental Investigation of Sexual Discrimination in Hiring in the English Labor Market

Peter A. Riach* Judith Rich†

*Bloomsbury, London, Peterriach@aol.com

†University of Portsmouth, Judy.Rich@port.ac.uk

Recommended Citation

Peter A. Riach and Judith Rich (2006) "An Experimental Investigation of Sexual Discrimination in Hiring in the English Labor Market," *The B.E. Journal of Economic Analysis & Policy*: Vol. 6: Iss. 2 (Advances), Article 1.

Available at: http://www.bepress.com/bejeap/advances/vol6/iss2/art1

An Experimental Investigation of Sexual Discrimination in Hiring in the English Labor Market*

Peter A. Riach and Judith Rich

Abstract

Pairs of carefully-matched, written applications were made to advertised job vacancies in England to test for sexual discrimination in hiring. Two standard résumés were constructed for each occupation to control for all relevant supply-side variables, such as qualifications, experience and age. Consequently any differential response recorded can be attributed to demand-side discrimination. Statistically significant discrimination against men was found in the 'female occupation' - secretary, and against women in the 'male occupation' - engineer. Statistically significant, and unprecedented, discrimination against men was found in two 'mixed occupations' - trainee chartered accountant and computer analyst programmer.

KEYWORDS: discrimination, employment, field experiment, hiring, sex

---

*This project was funded by a grant from the Faculty of Business and Economics, Monash University. We wish to thank Anne Kennedy, Hayden Mathysen and Natalie-Chantal McCaughey for their excellent research assistance. We wish to acknowledge the helpful comments of John List and two anonymous referees on an earlier version of the paper. Dr. Peter A. Riach, Bloomsbury, London WC1, United Kingdom. Address for correspondence: Dr. Judith Rich, Department of Economics, University of Portsmouth, Portsmouth PO1 3DE, United Kingdom.

The first field experiment of discrimination in employment, involving written job applications, was undertaken by the British sociologists Jowell and Prescott-Clarke (1970). They developed the technique to investigate racial discrimination in employment in England. The first application of the technique by economists was by Riach and Rich, who investigated sexual discrimination (Riach and Rich 1987) and racial discrimination (Riach and Rich 1991), in employment in Melbourne in the 1980s. More recently the technique has been applied by Neumark, Bank and Van Nort (1996) to investigate sexual discrimination in Philadelphia, and by Bertrand and Mullainathan (2004) to investigate racial discrimination in Boston and Chicago. What follows is the first systematic field experiment of sexual discrimination in the English labor market.

1. The Technique

Field experiments of labor market discrimination involve carefully-matched pairs (male and female in this case) testing by telephone, postal or electronic mail applications, and by attendance at interview. The methodological imperative of the technique is that strict control is exercised over all relevant employment characteristics, such as age, qualifications and experience, so that applicants differ only in their sex. In those experiments where pairs of applicants attend in person at interview there is a problem of ensuring, and demonstrating, such strict control. Despite careful training of the participating pairs it is impossible to ensure that all aspects of the applicants' performance are identical during their interaction with those performing the interview. In particular it is possible that, consciously or unconsciously, minority applicants may be motivated to prove the existence of discrimination, and thereby bias the results. A detailed discussion of this problem is contained in Riach and Rich (2002). To avoid this uncertainty we chose to make written applications to advertised vacancies. The precise nature of our technique was as follows. Two standard résumés were sent in response to job advertisements. In order to avoid detection they obviously could not be identical, but in all essential job characteristics, such as age, qualifications and experience, candidates were carefully matched, so that the only effective distinguishing characteristic was sex. Sex was identified by name, and both male and female were given traditional Anglo-Saxon/Celtic first names and surnames to avoid any possibility that the test could be confounded by racial discrimination. Unlike in the case of African Americans, sex can be unambiguously identified by the candidate's first name, provided, of course, that sexually-shared first names, such as Lindsay, are avoided. It follows that only one pair of names is required per occupation. For instance, in engineering our female name was Emma and our male name was Philip. To control for the possibility that the style and contents, such as hobbies and interests, of a particular letter might influence employer

response, letter-type was alternated regularly, and allocated equally between the sexes; that is, if one hundred applications were made, then on fifty occasions the female would be allocated letter A and the male letter B. On the other fifty occasions this would be reversed and the male would get letter A. If both female and male were invited to job interview this was treated as a case of no discrimination, or 'equal treatment'. If only one applicant was invited to interview this was treated as a case of discrimination. Where neither applicant was invited to interview this was treated as a non-observation, as it tells us nothing about an employer's use of sex as a screening device. Instead, it may simply indicate that a short-list was determined before our applications arrived, or that several other superior applications were received. In which case, the employer's penchant for discriminating on the basis of sex would have been put to the test only if our applications had arrived earlier or contained qualifications and experience of a different nature (McIntosh and Smith 1974, p. 24; Riach and Rich 2002, pp. F487-8). Previous research has indicated that some employers arbitrarily eliminate applications which do not include a contact phone number.

The advantages of written applications are that it is possible to exercise precise control over the content of applications; to ensure that all relevant characteristics other than sex are carefully matched; to ensure, by reversal of letter-type, that no unintended bias is introduced by any stylistic difference which is present to minimize the possibility of detection; and to demonstrate the controlled and objective nature of this procedure to the reader. The disadvantage is that it only tests for discrimination in labor-hiring at the initial stage of selection for interview. It is possible that some employers may delay their discriminatory activity until the interview, and in the final choice from amongst the interviewed short-list. Thus written tests do not measure the full extent of discrimination in the hiring decision, but, on the other hand, they do highlight one quite decisive form of discrimination – that of denying the applicant the chance even to compete for a job. In some cases field experiments of discrimination have involved a two-stage investigation: applying for interview and then attending, if invited. In such studies the bulk of discrimination has *always* been detected at the first (invitation to interview) stage: for instance, in the International Labour Office (ILO) investigations almost ninety per cent of the racial discrimination in employment detected in Belgium, the Netherlands and Spain was at this first stage (Riach and Rich 2002, pp. F493-F494).

The four occupations chosen for the study were computer analyst programmer, engineer (electrical and mechanical), secretary and trainee chartered accountant. Computer analyst programmer and chartered accountant are occupations which have a majority of male workers, but, nevertheless have a significant representation of women, as shown in Table1. We shall refer to them as 'mixed occupations'. The inclusion of these two occupations enables a useful

comparison with our Australian study (Riach and Rich 1987). Secretary is a 'female-dominated' occupation, whilst engineer is 'male-dominated': see Table1. This range of occupations enables us to test the *demand-side* impact on the full range of labor market outcomes. Neumark *et. al*. report that "…one restaurant owner explained the lack of waitresses in his upscale restaurant as 'a question of us seeing an endless number of male applicants and few female applicants'" (Neumark *et. al*. 1996, p. 917, footnote 5).

Table 1: Employee Numbers and Female Share of Occupations, UK, 2003

Occupation	Female Employees (number)	Male Employees (number)	Female Share (%)
Chartered and Certified Accountants	44,000	100,000	30.6
Computer Analysts and Programmers[a]	25,500	97,170	20.8
Engineering Professionals	21,000	423,000	4.7
Secretarial and Related Occupations	911,000	25,000	97.3

Source: Office of National Statistics 2003. *Labour Force Survey*, Spring (March-May).
Office of National Statistics 1991. *Economic Activity*, Volume 1 of 2, Table 6.

Our bogus applicants were located in central London, therefore, in the case of secretary, we confined our search to jobs within easy commuting distance of central London, and took vacancies from the Saturday and Monday editions of the Guardian newspaper and the Monday edition of the Evening Standard. In the case of the three professional occupations we considered that it was more likely that applicants would be assumed to be prepared to relocate, so we extended our search geographically (see Table 2).

Analyst programmer vacancies were taken from *Computing* and *Computing Weekly* and from an internet job-site. Engineering vacancies were taken from an internet job-site. In the case of trainee chartered accountant applications were made to all authorized training firms in England. Applications were sent one day apart to minimize any risk of detection. Two standard résumés were devised for each occupation and in these the marital status of the two applicants was identical and age differed by one year. The résumés were prepared

with the assistance of senior academic colleagues in accounting, computing and engineering. The résumés for secretary were prepared with the assistance of a senior member of the human resource management department. British university degrees are classified into four classes: first, upper second or two-one, lower second or two-two, and third. Only a small percentage (8.9%) of elite students obtain a first, so two-one is the acknowledged good quality degree obtained by 44.8 percent of students (Higher Education Statistics Agency 2000/1). In their résumés all our graduates had two-one degrees, so they were at least equal to the average calibre of applicants in accounting, computing and engineering. Two samples of résumés are included in the Appendix. We were unable to apply for public sector job vacancies, as nowadays they invariably demand the completion of an application form, rather than the submission of a résumé. It follows that all our observations are for the private sector.

We could not use the names of genuine educational institutions or employers in the résumés for two reasons. First there is the risk of detection if an employer were to make direct contact with a genuine company or university falsely cited in a résumé. Secondly an educational institution might take legal redress against a party falsely claiming to possess one of its awards. We decided to deal with this difficulty by inventing bogus universities and employers. Just such an approach had been adopted in the ILO's investigation of racial discrimination in the German labor market: bogus schools and universities were invented. There are approximately eighty universities in Britain and all but a handful have locational names; either of a city or a county. We therefore chose an English city and county which did not have universities, but which quite plausibly might, and have used them in the résumés of all occupations where a university degree would be expected. There was a flood of new universities in the decade prior to these tests. In 1992 twenty polytechnics became universities with names like De Montfort, South Bank, Liverpool John Moores and London Guildhall. Since then there has been a steady trickle of additions with Gloucestershire, Luton and Thames Valley amongst those acquiring universities. If counties such as Hertfordshire and Staffordshire have universities why might not Herefordshire and Shropshire? If towns like Loughborough, Bournemouth and Brighton have universities is it not conceivable that Ipswich, Salisbury and Winchester have universities? We therefore believe that employers recruiting graduates in computing, engineering and accounting/business studies, which traditionally were strong in the former polytechnics, would be unlikely to have a definitive knowledge of the current list of universities. We did obtain responses from very large accounting firms and major recruitment agencies. The British system of external-examining is intended to ensure that degrees are of comparable standard across the university sector, so there should be no concern about the caliber of the graduates from our bogus universities. In the case of former employers' names we

have claimed always to have worked for small manufacturers or professional firms and fabricated a name. The main precaution here was to check the Yellow Pages to ensure we had not inadvertently used a real name.

Cultural and sporting interests were chosen to be interchangeable because of the need to reverse résumés. They were also deliberately chosen to suggest that neither applicant had stereo-typical sexual traits; the interchangeable interests included classical and contemporary dance, marathon running, greyhound racing and flute and language classes.

The two postal addresses which we used were approximately one mile apart in comparable socio-economic districts of central London. We cited a telephone number answered by a machine on one application and a fax number on the other. We have always been very careful to retain documentation of our research, so our procedure with the answering machine was to take details for filing, but also to transfer the response to a master tape. The most fruitful source of vacancies for engineers and analyst programmers were job sites on the internet. Therefore we located vacancies by specified qualifications etc. and then submitted résumés electronically to notified vacancies. Once again we were careful to print off applications and replies, so hard copies could be filed.

When an invitation to job interview was received, a telephone call was made early the following day declining the invitation, so as to minimize any inconvenience to the employer. This deceptive experimental technique imposes on the employer, briefly, a non-genuine transactor in a manner which is not infrequent in the labor market, as participants carry out the process of search and the acquiring of bargaining chips for negotiations with current and prospective employers. The justification for this minor act of deception is that it is the only effective way of discovering how employers actually do behave in practice, as distinct from how they might claim to behave when questioned about their employment practices. The distinction between actual and claimed behavior was dramatically demonstrated over fifty years ago by La Piere (1934) in a classic study. In an extensive trip through the USA with a Chinese couple, admittance was gained to all except one of two hundred and fifty-one hotels and restaurants approached, whereas, in response to questionnaires sent six months later to the same establishments, over ninety per cent replied that they would *not* accept Chinese guests. Employers' replies have been kept strictly confidential to the authors of this paper and the research assistants. For a more detailed discussion of the ethical issues involved see Riach and Rich (2004).

The intention of this experimental method is to control strictly for all productivity-determining variables, so that it is sex alone which distinguishes the candidates and therefore accounts for any differential treatment. To allay any possible concerns that personality differences between the sexes may lead to perceived productivity differences, our résumé reversal procedure produces

women who are interested in running marathons and racing greyhounds, and men interested in classical dance and learning languages; that is, our applicants are not sexually typecast.

2. The Results

The results of the experiment are set out in Table 2 in a format which follows McIntosh and Smith (1974, p.13) and which has since been adopted in field experiments across Europe; e.g. Brown and Gay (1985); Bovenkerk (1992, pp.26, 31) (see Riach and Rich 2002, pp. F486-F491). Column 4 shows the number of occasions when one or both applicants received a favorable response; by post, telephone, fax or email. This total is divided as follows: column 5 shows occasions when both received favorable responses (equal treatment); column 6 shows occasions when only the male received a favorable response (discrimination against the female); and column 7 shows occasions when only the female received a favorable response (discrimination against the male). Column 8 is net discrimination; that is 7 minus 6, so that it is negative when men encountered more discrimination than women. Column 9 provides details of responses by letter-type. The statistical significance of any finding of net discrimination was determined by the application of the chi-square test. The data were categorized as accepted /rejected for two applicants in a 2*2 contingency table (Riach and Rich 2002, pp. F493 – F496).

The purpose of this paper is to use a carefully-controlled field experiment to test for employment discrimination. The logical imperative of the experimental technique is to *design* the experiment (in particular, the résumés) so as to *control* for all factors, other than sex, which may influence selection for interview. The résumés are identical in all aspects of human capital. Also, they are regularly reversed, in case any unintended difference has been introduced by the need to differentiate them, in order to avoid detection. Consequently we can conclude that any systematic preference for one of the two candidates is attributable to the one characteristic which is being controlled for. The data cannot be controlled for more formally, such as, by regression analysis, *after* the experiment has been conducted. If the experiment has been correctly-designed there can be no impact from any, but the target, variable. On the other hand, if the style of one résumé has influenced outcomes this should be detected very early in the running of the experiment, and subsequently corrected. We tested the impact from letter type on the final data, again using chi-square, and report the results in Table 2, note 2. Our finding that no statistical significance attaches to letter type indicates that we had successfully controlled for other factors, such as socio-economic background, in the résumés. The scientific challenge in field experiments is careful ex ante *design*; not ex post statistical manipulation.

Table 2: Results for the Sex Discrimination Tests

1	2	3	4	5	6	7	8	9	
Occupation	**Location of test**	**Neither invited**	**Usable tests**	**Equal treatment**	**Discrim-ination against female**	**Discrim-ination against male**	**Net Discrim-ination [a]**	**Letter type**	
								A	**B**
Chartered accountant									
Total (number)	England	284	55	22	11	22	11	40	37
Per cent			100	40	20	40	-20.0*		
Interview/Chat			23	5	4	14	10	13	15
Per cent			100	21.7	17.4	60.9	-43.5**		
Computer analyst programmer									
Total (number)	London and South East	96	34	14	4	16	12	23	25
Per cent			100	41.2	11.8	47.1	-35.3**		
Engineer									
Total (number)	London, South, SE, Home Counties	134	39	12	18	9	9	24	27
Per cent			100	30.8	46.2	23.1	23.1*		
Secretary									
Total (number)	London	180	51	13	8	30	22	36	28
Per cent			100	25.5	15.7	58.8	-43.1***		

Note 1: Chi-squared tests were conducted on the response rates and the results are indicated in column 8 - * significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level.

Note 2: Chi-squared tests were also conducted on the outcomes for letter type and in no case was a difference significant at the 0.05 level.

a. A negative value indicates discrimination against the male applicant.

In the 1980s, when applications and replies were by post, a favorable response almost inevitably involved an invitation to a face-to face interview. Nowadays with the widespread availability of telephone-answering machines, faxes and computers, and with the increased involvement of recruitment agencies in the hiring process, favorable responses were of a more variable nature. In the case of secretary, where all applications were by post, and recruitment agencies were largely avoided, responses came by post, fax and telephone. The majority of responses were invitations to a formal interview, but a small minority involved a request for a telephone discussion. In the case of trainee chartered accountant, where all applications were by post, twenty-three responses involved an invitation to interview or a request for a telephone discussion. The thirty-two other responses involved returning an application form to the applicant or requesting recontact at a latter date. In the case of computer analyst programmer, where most applications were submitted electronically only two favorable responses involved invitation to formal interview. The remainder was requests for a telephone discussion or for more details transmitted electronically, which represents the email equivalent of a 'discussion'. This outcome reflected the heavy involvement of recruitment agencies in this occupation. In the case of engineer, where all applications were submitted electronically, all responses were for a discussion, either in its telephone or electronic format, and again this reflected the heavy involvement of recruitment agencies in this labor market.

In the two 'mixed occupations' there was statistically significant discrimination against men. Men encountered discrimination four times more frequently than women in analyst programming, and three and a half times more frequently than women in chartered accounting, when it came to the serious business of interviewing, rather than the mechanical process of dispatching application forms. When training firms issued invitations to interview, men were denied interviews on 60% of those occasions, whereas women were so denied at a rate of only 17%. Men were denied interviews at a rate of 47% in analyst programming, compared with 12% for women. In the 'male-dominated' occupation of engineering, women encountered discrimination at twice the male rate; women were rejected for interview on 46% of the occasions when invitations were issued, compared with a male rate of 23%. In the 'female-dominated' occupation of secretary men encountered discrimination at almost four times the female rate; men were rejected for interview on 59% of the occasions when invitations were issued, compared with a female rate of 16%.

It might be speculated that the results in analyst programming and chartered accounting represent an informal instance of affirmative action, as employers attempt to balance the sex ratio at interview in the face of a preponderance of male applicants, with discrimination *against* women delayed until the job offer stage, however affirmative action is not currently condoned by

the British sex discrimination legislation. Moreover, as explained in Section 2 above, two-stage field experiments of discrimination have always detected that the vast bulk of discrimination occurs at the invitation to interview stage. This is logical behavior, as if an employer does not want to appoint a particular candidate, for whatever reason, it is tactically astute to deny them an interview, because this leaves the candidate devoid of evidence on which to bring a complaint. We return to this point in Section 5.

These results are all statistically significant: in the cases of secretary, analyst programmer and interviews for chartered accountancy traineeships the results are significant at the one per cent level, so the null hypothesis - that there is no relationship between sex and employer hiring response - is rejected. This technique captures discrimination of a particularly decisive form; the denial to the individual of the opportunity even to present herself/himself in a competitive fashion before an interview panel; the screening out of applicants at the very outset of the hiring process, because of some personal characteristic, such as sex.

These results amount to a curate's egg for the British Equal Opportunity Commission (EOC). There is some encouragement for them in the preference shown for women in the two mixed occupations, but the discrimination recorded is at a disturbingly high rate (four to one), which must be of some concern in a legal environment which precludes affirmative action. Also a continuation of this rate of discrimination could see these occupations becoming 'female-dominated', which is presumably not the EOC's objective. The results in engineering and secretary are clearly disturbing, as they indicate a lack of success in breaking down sexual stereotypes.

Some interesting comparisons can be made with other experimental studies. Whereas in this English experiment we recorded discrimination in favor of women in chartered accounting, in our Australian study we recorded a net rate of discrimination against women in management accounting of 7%, although it was not statistically significant at the five per cent level (Riach and Rich 1987). The Australian State of Victoria enacted sex discrimination legislation in 1977, so the main differences, between the two studies, are the length of time for the legislation to have had an impact, the seniority of the job, and employment in a public company/commercial environment, rather than a professional office. Without setting up simultaneous and identical experiments it is not possible to distinguish between these possibilities, in explaining the difference between the Australian and English results.

The results for computer analyst programmer are also contrary to research abroad. We included this occupation in our Australian study and recorded net discrimination against women of 12%, which was significant at the two per cent level (Riach and Rich 1987): in marked contrast to the finding of net discrimination against men of 35% in England. These experiments are separated

by fifteen years and twelve thousand miles, but this does indicate some dramatic English success in female access to a relatively new area of professional employment.

The secretarial results are consistent with Levinson (1975), who made telephone inquiries to male and female-dominated jobs in Atlanta, USA. Fifty-seven secretarial vacancies were amongst the one hundred and ten 'female jobs' to which he applied. He found 'clear-cut' discrimination against men in these jobs of 44%, compared with our result of 30% for London secretarial vacancies. Clearly, sex stereo-typing is enduring in this supportive activity, and is not confined to England.

Graduate engineers have not been the subject of any other experiment, but Nunes and Seligman (2000) tested automobile service jobs in San Francisco and found discrimination against women which was significant at the one per cent level. Levinson included thirty-seven auto mechanic and skilled serviceman vacancies amongst the one hundred and forty-six 'male jobs' to which he applied. He found 'clear-cut' discrimination against women of 28% in these 'male jobs'. These results in 'male-dominated' jobs are consistent with our finding of statistically significant discrimination against women in applications to English engineering vacancies.

Levinson noted a higher rate of discrimination against men in 'female jobs', than against women in 'male jobs' (44% compared to 28%). He attributed this to sex being a more salient characteristic of 'female' than 'male' jobs; for example secretaries being expected to fill a decorative role. Also he suggests that greater deviance attaches to male applicants for 'female jobs', than to female applicants for 'male jobs'; the implication is that such a man is an undesirable underachiever, because he is seeking lower status 'female employment' (Levinson 1975, p. 540). Our English results show a similar pattern; a 43% net discrimination rate against male applicants for secretarial vacancies, compared to a 23% net discrimination rate against female applicants for engineering vacancies.

Certainly the most striking result of our English experiment is the high net rate of discrimination against men for analyst programmer vacancies and in interview offers for chartered accountancy traineeships. This suggests substantial progress in opening up professional employment opportunities to women. On the other hand, the secretarial results indicate that some sexually stereo-typed images remain entrenched. This is reflected in the British media. We have long been accustomed to seeing female police inspectors (Jane Tennyson) and female forensic pathologists (Sam Ryan) on our television screens, but male secretaries are nowhere to be seen.

3. Interpretation of the Findings

3.1 Personality or Discrimination?

Neumark *et. al*. and Weichselbaumer (2004) consider the possibility that personality traits, rather than discrimination, might be the explanation for differential treatment. We explained above that we have attempted to create applicants who are not sexually typecast, by our choice of sporting and cultural interests, and by our reversal of résumés. Therefore our written applications have ensured a degree of control over this personality variable. Moreover, we are not convinced that any differential treatment, which did arise from personality traits, would represent a productivity-induced response, rather than discrimination. Neumark *et. al*. concern themselves with - "…personality differences that differ systematically by sex, and that are *valued differently* by restaurant owners…" and go on to recommend that researchers - "…attempt to eliminate sex-related personality differences *that might influence employers' decisions*" (Neumark *et. al*. 1996, p. 922, emphasis added). This begs the question of whether personality does actually impact on the output of goods or services, or, instead, generates discriminatory responses. The male personality might be *valued differently* by restaurant owners because it appeals to customers' prejudices about the style of service they should experience in an expensive restaurant, in which case the employer is an agent transmitting customer discrimination. Chiplin and Sloane (1976) argued long ago that personality traits may be valued, although not necessarily productivity-related. "Thus if past job holders were male, it may be that they possessed attributes which were, in fact, unrelated to performance, but noted by the employer on his job specification. A personnel manager given the task of replacing a middle-aged white man may tend to favour an applicant of the same age, race and sex, although the job could be performed equally well by a young, black woman" (Chiplin and Sloane 1976, pp. 73-4).

Women may be preferred to men in the role of secretary, which, in England, often involves making coffee, washing dishes etc., because they are considered to be more obliging, and controllable than men. This personality difference *might influence employers' decisions,* but they so decide because they expect it will make their life easier, in the belief that women are more acquiescent secretaries; not because it will increase the output of goods or services. In this case the discrimination is the employers' own.

3.2 Supply or Demand?

Nelson and Polacheck (1995) argue that the experimental procedure ignores the supply-side; in particular the relative proportion of male and female applicants.

Obviously these precise data cannot be obtained, because of the deceptive nature of the procedure, but it is our practice to present the occupational sex mix, as in Table 1. This enables some, admittedly imprecise, inferences to be drawn about the sex mix of applications.

Nelson and Polacheck argue that there may be statistical discrimination, because a low proportion of female applicants may imply a low acceptance probability, in which case search cost minimization will weigh against female candidates. It is not, however, explained why a low proportion of female applicants implies a low acceptance probability. An analogy is drawn with the receipt of a minority of 'out-of-state' applicants – "…the probability that an out-of-state applicant will accept a job offer is low… If the firm finds it costly to offer a job that is refused, prudent employers will tend to offer jobs only to in-state residents, rather than an out-of-stater with otherwise identical characteristics" (Nelson and Polacheck 1995, p. 396). But the very nature of the geography suggests that, on average, 'out-of-staters' will have made more applications than 'in-state' applicants; that is, it is their 'out-of-state', rather than minority, status which produces the expectation of a low acceptance rate and, therefore, statistical discrimination. What would Nelson and Polacheck expect if 'out-of-staters' were a majority of the applicants? They would still have a lower probability of acceptance.

Nevertheless they continue "Like the case of out-of-staters, a firm can easily conceive the probability of an offer being accepted to be related to the proportion of applicants of a particular identifiable group. For example, relatively few female applicants (all else constant) can easily signal low acceptance probabilities and hence high hiring costs associated with keeping jobs vacant too long" (Nelson and Polacheck 1995, p.396). Why? Minority status has certainly not disadvantaged our female accountant and analyst programmer applicants; Table 1 shows that women are a minority of the profession; Table 2 shows their four-to-one success rate in obtaining positive responses from employers.

3.3 Statistical or Tastes?

Experimental studies such as this one are specifically designed to provide a direct and unequivocal measure of discrimination in labor-hiring. Nevertheless we can investigate the pattern of results for possible inferences about the sources of discrimination. Why do some employers deny themselves the opportunity to consider for employment a group of applicants distinguished only by their sex? The two principal hypotheses available to explain such discrimination are Becker's (1971) 'taste'theory and Phelp's (1972) statistical' theory.

The statistical theory stresses the incomplete information about the productivity of individual workers, which induces employers to resort to

generalizations about the labor force characteristics of groups, as a screening device to minimize the cost of information acquisition in the hiring process. In the case of sex discrimination, in occupations with substantial fixed costs of employment, this 'statistical' response is assumed to be particularly directed at the maternal role of women; their job tenure under suspicion because of possible pregnancy and their reliability suspect because of child-care responsibilities. We found discrimination *against* women in engineering, but *in their favour* in chartered accountancy and analyst programming. This pattern cannot be reconciled with the use of crude screening procedures across the professional labor market.

In these three professional occupations it is difficult to attribute the discrimination which we found to the tastes of customers, as there is not a lot of direct interaction between employees and customers in these professions. The discrimination is more likely to have been employer driven. Could it be that, in the professional occupations where women have established a presence, employers have had the opportunity to recognise that they are more congenial, industrious, reliable employees, and have consequently developed a 'taste' for them as employees? (Chiplin and Sloane 1976, pp. 73-4)**.** If so, it suggests a case for temporary affirmative action, so as to ensure that employers in other areas 'learn by experiencing' that women do have desirable employment characteristics.

Now that several empirical studies have provided an empirical foundation which indicates that discrimination is prevalent in the marketplace, it is important to explore the origins of this discrimination. Findings from field studies appear to be more consistent with the hypothesis that the majority white populations having a general "distaste" for minorities in the sense of Becker (1971), or a general "social custom" of discrimination in line with Akerlof (1980), although statistical discrimination as described by Arrow (1973) and Phelps (1972), cannot be ruled out, ex ante or ex post (Riach and Rich, 2002, pp. F499-F503). Some experimental studies have recently attempted to explore the nature of discrimination. For example, List (2004) provides a framework for parsing the two forms of discrimination, by using a series of field experiments in an actual marketplace. In addition, recent laboratory experiments have also provided insights into discrimination. For example Fershtman and Gneezy (2001) found that ethnic discrimination was due to (mistaken) stereotyping, rather than to a taste for discrimination.

Important insights into labor market discrimination can also be gained from 'natural experiments'. Goldin and Rouse used naturally-occurring data, rather than data generated by experiments, to test for sex discrimination in the hiring of musicians by orchestras. They used the hiring outcomes when orchestras did, and did not, use a screen to hide the musician auditioning, together with other relevant information, to estimate a model explaining the probability of an

individual advancing in an audition (Goldin and Rouse 2000, p. 726). They found persuasive evidence that a screen increased the probability that a female would be hired by an orchestra.

4. Conclusion

Our results in the sex-stereotyped occupations: engineer and secretary are consistent with the findings of experimental studies which have been conducted in other countries. This reflects a lack of progress in undermining sexually-typecast attitudes on the part of employers and customers. In particular, the supportive (and decorative?) role of secretary is widely considered as one which needs to be filled by a woman. On the other hand, our findings in the 'mixed occupations' of chartered accountant and analyst programmer are without precedent (Riach and Rich 2002, p. F505).

We do not believe the differential treatment recorded in our study reflects any personality differences in the candidates which could influence productivity; nor do we consider that it could be accounted for by supply-side variables. Instead the nature of our controlled experiment enables us to conclude with confidence that this differential treatment represents demand-side discrimination.

Being an "Investor in People", which is a British accolade for good employment practice, did not preclude discriminatory activity. For example, one firm, which carried this insignia on its letterhead, wrote to the female applicant on 16 November "I regret to inform you that you have not been selected on this occasion". The same person from the same firm wrote to the male applicant on 10 December "I have pleasure in forwarding an application form…. if you would like to apply for one of our vacancies please complete the application form and return it".

Sometimes the replies to applications demonstrated an alarming, but inventive, lack of veracity as the following two examples demonstrate. In the first example, on the 26 November the female applicant to a chartered accounting firm was sent the following invitation - "Please could you telephone me in order to discuss your CV in greater detail as we may possibly have a suitable vacancy". On the same day the same person wrote to the male applicant - "Unfortunately, we have no vacancies for which we are able to consider you as we require staff to have had a minimum of eighteen months' experience". Our candidates, of course, had equivalent experience. In the second example, on 9 November the female applicant was told "I am afraid that I don't think I will be interested in your application as I suspect that money will be a problem". On 30 November the same person wrote to the male applicant - "I would be grateful if you would either telephone myself (sic) or my secretary to arrange an appointment for you to come

and visit us". Neither candidate had indicated anything whatsoever about money and were aged one year apart.

This dishonest concealment of discriminatory hiring activity has been noted repeatedly in experimental studies; see Riach and Rich, 2004. Such behaviour has important implications for the current British approach to equality of opportunity policy, which is *anti-discriminatory, complaint-based*, with the enforcement body cast in a *passive* role. The onus is on the rejected applicant to activate the legislation and to demonstrate that sex was the reason for the rejection. Experimental studies, such as ours, demonstrate the uninformative, and sometimes dishonest, nature of rejection letters, which means that candidates may not know, let alone be able to demonstrate, that they have encountered sexual discrimination. This presumably explains the repeated finding, in two-stage experiments, that the vast bulk of discrimination occurs at the "invitation to interview" stage. The most efficacious, and safest, time to exercise any discriminatory penchant is at the very outset, so that the rejected applicant is left with zero evidence to seek redress.

This leads us to the following policy recommendations. The first policy option would be to take action to enable this *anti-discriminatory*, *complaint-based*, *passive*, enforcement process to operate effectively. Our recommendation is that employers be required to provide unsuccessful applicants with a brief résumé, listing qualifications and experience, of the successful applicant. This would either provide *prima facie* evidence of discrimination, or allay the suspicions of rejected applicants. Applicants would be required to assent to this procedure when they submitted their application. Such a disclosure requirement would make those responsible for the hiring decision much more cautious about engaging in discriminatory activity, as they would realize that any applicant treated in a discriminatory fashion would now possess *prima facie* evidence to initiate a complaint to an employment tribunal.

The second policy option would be to turn the Equal Opportunities Commission's role from a passive to an active one; that is to empower the Equal Opportunities Commission to conduct random audits of hiring and personnel practices. If employers were required to keep all records of job applications for a period of twelve months, and obliged to justify decisions on short-listing for interview and final choice of candidate, in the event of random audit, it would reinforce the pressure for scrupulousness in the hiring decision, which derives from the former proposal. An appropriate analogy can be drawn here with the capital market. Public corporations have various duties with respect to reporting to shareholders, potential shareholders and the business community at large. They are also subject to independent financial audit, and they are usually required to satisfy an independent commission about various aspects of their financial activities. In effect, capitalist economies provide a range of regulations and

checks to protect the owners of financial capital against unscrupulous practices and guard against the waste of this resource. Therefore it seems entirely appropriate that similar protection be afforded the owners of human capital, and that steps be taken to prevent it being wasted through employers using screening devices, such as sex, for purposes unrelated to job performance. Barbara Bergmann advocated such a policy in 1986 (Bergmann 1986, p. 158). The American Equal Opportunity Commission now has power to *initiate* investigations of discrimination, (US Equal Employment Opportunity Commission 2005, p. 1)

The third policy option is to switch from a complaint-based procedure, where the onus is on applicants as "claimants" to convince the employment tribunal that they had been discriminated against, to a procedure where the onus would be on employers to justify their employment decisions. Just such a proposal was included in the policy of the British Labour Party (which has now been in government since 1997) as far back as 1991 – "Instead of women having to prove discrimination the employers will have to prove non-discrimination" (Labour Party 1991). In November 2000 the European Parliament legislated to shift the burden of proof from complainants to respondents in recognition of the difficulty applicants have in obtaining evidence (ILO 2003, p. 61, footnote 45, Council Directive 2000/78/EC).

There is room for debate on how to strengthen anti-discriminatory legislation, but what is not in dispute is the need to strengthen it. Brown and Gay concluded "…the heart of the problem is that employers know that cases rarely get as far as legal action because the victim is very unlikely to be aware that he or she has been discriminated against," (Brown and Gay 1985, p.32). We would add that even where an applicant suspects that he/she has been the victim of discrimination, current labor market practices make it extremely difficult to present a *prima facie* case to the courts.

Appendix
Two Résumés Used in Job Applications for Mechanical Engineering

RÉSUMÉ A

NAME P. B. (male name) /or E. M. (female name)

EMAIL: p.b.@hotmail.com /or e.m.@hotmail.com

BIRTH DATE 30-6-77

SINGLE

QUALIFICATIONS & TRAINING

GCSE passes in 8 subjects including Maths and English
Three A Levels Maths (C), Physics (B), Chemistry (C)
BEng (Mechanical) Upper Second, University of S

WORK HISTORY

Since 1999 I have been working for Mamma's Foods which produces pre-packed meals for supermarkets. I have gained experience in production planning and control while at Mamma's Foods where various dishes are prepared to suit stock requirements for supermarket customers this includes "Just in Time techniques". In addition I have experience in operations management and manufacturing technology as I had the responsibility for ensuring the production machinery runs 24 hours in three shifts and to adapt the production rates as necessary. I also have experience in Quality Management, while at Mamma's Foods I was a member of a team responsible for the firm gaining ISO9003. Mamma's Foods has been expanding recently and this has ensured a challenging variety of work.

OUTSIDE INTERESTS

Marathon running, flute lessons and language classes.

RÉSUMÉ B

NAME: E. M. (female name) /or P. B. (male name)

EMAIL: e.m.@hotmail.com /or p.b.@hotmail.com
AGE: 25

MARITAL STATUS: Single

EDUCATION: 8 GCSE's including English Language and Mathematics

3 A Levels:	Maths	B
	Physics	C
	Biology	C

2:1 Mechanical Engineering Degree from University of H

EMPLOYMENT:

For the last three and a half years I have been employed by Criterion Press, which produces greeting cards, reception menus, wedding invitations, and similar products. I have gained experience in computer aided design, where I have designed modifications to our printing processes, doubling our output without any loss in quality the requirements for ISO quality are paramount for Criterion Press because our customers demand guaranteed quality. As a mechanical engineer I have had the responsibility for engineering systems and instrumentation and control in the factory, and have instigated novel controls throughout the printing process. I have gained experience in inspection methods for incoming and outgoing materials. This provides a challenging job for a mechanical engineer as frequently there is a need to ensure large and small batch production and a quick turnaround of material.

HOBBIES & INTERESTS:

Classical and contemporary dance and greyhound racing.

References

Akerlof, G. (1980). "The Theory Of Social Custom, Of Which Unemployment May Be One Consequence", *Quarterly Journal of Economics* 94, 749-775.

Arrow, K. (1973). "The Theory of Discrimination." In Ashenfelter, O. and A. Rees (eds) *Discrimination in Labor Markets* (Princeton: Princeton University Press).

Becker, G. (1971). *The Economics of Discrimination*, 2nd edition (Chicago: University of Chicago Press).

Bergmann, B. (1986). *The Economic Emergence of Women* (New York: Basic Books).

Bertrand, M. and S. Mullainathan (2004). "Are Emily and Greg More Employable Than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination", *American Economic Review* 94, 991-1013.

Bovenkerk, F. (1992). *Testing Discrimination in Natural Experiments: A manual for international comparative research on discrimination on the grounds of 'race' and ethnic origin* (Geneva: International Labour Office).

Brown, C. and P. Gay (1985). *Racial Discrimination 17 Years After the Act* (London: Policy Studies Institute).

Chiplin, B. and J. Sloane (1976). *Sex Discrimination in the Labour Market* (London: Macmillan).

Fershtman, C. and U. Gneezy (2001). "Discrimination in a Segmented Society: An Experimental Approach", *Quarterly Journal of Economics* 116, 351-377.

Goldin. C. and C. Rouse (2000). "Orchestrating Impartiality: The Impact of 'Blind' Auditions on Female Musicians", *American Economic Review*, 90, 715-741.

Higher Education Statistics Agency (2000/1) http://www.hesa.ac.uk/holisdocs/pubinfo/stud.htm

ILO (2003). *Time for Equality at Work*, Report I(B) (Geneva: International Labour Office).

Jowell, R. and P. Prescott-Clarke (1970). "Racial Discrimination and White-Collar Workers in Britain", *Race* 11, 397-417.

Labour Party (1991). *A New Ministry for Women* (London: Labour Party).

La Piere, R. (1934). "Attitudes vs Actions", *Social Forces* October, 230-237.

Levinson, R. (1975). "Sex Discrimination and Employment Practices: An Experiment With Unconventional Job Inquiries", *Social Problems* 22, 533-543.

List, J. (2004). "The Nature and Extent of Discrimination in the Market Place: Evidence from the Field", *Quarterly Journal of Economics* 119, 49-90.

McIntosh, N. and D. Smith (1974). *The Extent of Racial Discrimination*, Political and Economic Planning Broadsheet no.547 (London: Political and Economic Planning).

Nelson, P. and S. Polachek (1995). "Discerning Discrimination: Does Interviewing Firms Make A Difference?", *Eastern Economic Journal* 21, 393-398.

Neumark, D. with the assistance of R. Bank and K. Van Nort (1996). "Sex Discrimination in Restaurant Hiring: An Audit Study", *Quarterly Journal of Economics*, 111, 915-941.

Nunes, A. and B. Seligman (2000). *A Study of the Treatment of Female and Male Applicants by San Francisco Bay Area Auto Service Shops*, The Testing Project of the Impact Fund (San Francisco: The Impact Fund).

Office of National Statistics (1991). *Economic Activity*, 1 of 2 (ONS, London).

Office of National Statistics (2003). *Labour Force Survey*, Spring (March-May) (London: ONS).

Phelps, E. (1972). "The Statistical Theory of Racism and Sexism", *American Economic Review* 62, 659-661.

Riach, P. and J. Rich (2004). "Deceptive Field Experiments of Discrimination: Are They Ethical?", *Kyklos* 57, 457-470.

Riach, P. and J. Rich (2002). "Field Experiments of Discrimination in the Market Place", *Economic Journal* 112, F480-F518.

Riach, P. and J. Rich (1991). "Testing for Racial Discrimination in the Labour Market", *Cambridge Journal of Economics* 15, 239-256

Riach, P. and J. Rich (1987). "Testing for Sexual Discrimination in the Labour Market", *Australian Economic Papers* 26, 165 – 178.

US Equal Employment Opportunity Commission (2005). http://www.eeoc.gov/

Weichselbaumer, D. (2004). "Is it Sex or Personality? The Impact of Sex-Stereotypes on Discrimination in Applicant Selection", *Eastern Economic Journal* 30, 159-86.