

Explaining Gender Pay Gap Among Recent College Graduates –Discrimination or Supply Side Factors?*

by

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Abstract: *In this study we set out to investigate why university educated women receive lower earnings in the Swedish labor market. The different data sources from registered data and hiring experiment gave us a unique opportunity to directly study the role discrimination and supply side factors in explaining early career gender pay gap.*

Using registered data for childless and single recent college graduates-a group expected to have similar labor market commitment- we found a gender pay gap of 11 % upon entry into labor market. Out of the total gap we found that more than 76 % of the gap is explained by pre-market factors, primarily field of education. Adding controls for job related factors increases the explained gap to about 80 %. The gender difference in earning that is unexplained by the above factors is rather small ranging between 2.2 to 2.7 %.

Using another data set focusing on the job hiring process by sending fictitious applications to real job openings in the Swedish labor market we gain knowledge on if women are discriminated against in jobs that require a university education. If anything, the results indicate that female job applicants are preferred over male job applicants and that they are valued similarly on most characteristics. Our result suggests that supply side factors are important in addressing gender inequality even among college graduates with comparable labor market attachment.

Key words: Gender earnings gap, field experiment on hiring, employer discrimination

* We thank Jens Agerström, Rickard Carlsson, Claudia Goldin, Larry Katz, Inga Persson, Nina Smith, Maria Stanfors and seminar participants at the "Women in Academia" conference held in Skanör (Sweden) in May 2010 for valuable comments to this draft. A research grant from the social sciences faculty at Linnaeus university and another from the Swedish Council for Working Life and Social Research are gratefully acknowledged.

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1. Introduction

In the past few decades, a number of industrialized countries recorded an increase in the number of female university graduates and even surpassed the number of male graduates. Since 1977 women for the first time in the Swedish history surpass men in entering a university education, a fact that has not changed since then. Nevertheless, after an initial successive decline in gender wage gap during 1960's and 70's, the average gender wage gap has not showed any signs of decline since the 1980's (Johansson et. al., 2005, Edin and Richardson, 1999). Even more surprising/puzzling result in case of Sweden is that within university graduates the gender wage gap increased during 1991-2001 (see Gustavsson 2006). In a comparative gender gap study by level of education for US, Netherland and Sweden, Evertsson et. al., (2009) also found that wage gap is the greatest for highly educated individuals in Sweden and Netherland, while the reverse is true for US¹. For Sweden, Albrecht et. al., (2003) showed that gender earning gap increases as we go towards upper distribution of wage (34 % at the 90th percentile, as opposed to the one at the mean of 16 %) and they also showed that gender gap in returns to education is the highest among university graduates.

Given the above background, it is of interest to study why university graduate women receive less wage/earning than men. In the past, most Swedish studies have focused on the overall population and little attention has been given to gender earning gap among university graduates. Recent advances in the literature for US and few European countries have investigated gender/wage gap among university graduates and showed that gender difference in field of education plays important role in explaining gender wage/earning gap. Using starting wage offers of 1974 to 2001 graduates in US, McDonald and Thornton (2007) found than up to 95 percent of the starting gender wage offer gap is explained by college major. For UK and Germany, Machin and Puhani (2003) showed that 8 to 20 % of the wage differential is attributed to gender difference in field of education. While other studies focus on gender difference in accumulation of work experience and they showed that the tendency of women to make more frequent job interruption than men, perhaps due to childbirth and childrearing, explains important part of the gender earning gap (see Manning and Swaffield 2008, Mincer and Polacheck 1974). Triventi (2007) on the other hand used data coming from REFLEX survey of 16 European countries on

¹ While other attributes like labor force participation, work hours, occupational segregation and hours work decreases with increasing level of education in all three countries.

college graduates in 2000 and found that occupation related characteristics are the most important factors in explaining the gender pay gap. Though a major concern with the later occupation related factors is that it is not obvious to what extent they can explain the gender wage gap since they can arguably be affected by discrimination in labor market.

Yet another strand of the literature use experimental data and has been especially interested in the demand side focusing on employer discrimination. These studies used field experimental methods in which fictitious male and female job applicants were given identical résumés, some finding evidence of employer discrimination (Neumark, Bank and van Nort, 1996) and others not (Carlsson, in press).²

Hence, there is not only one candidate explaining the gender wage gap and “a fundamental challenge for labor economists is to identify the extent to which observed gender differences in labor market outcomes for apparently identical men and women are due to discrimination, to other unobservable factors, or to intrinsic differences between men and women” (Booth, 2009, p. 600).

Implementing a combination of research designs being used in the above mentioned studies we set out to investigate why university educated women receive lower earnings in the Swedish labor market. The different data sources from registered data and hiring experiment gave us a unique opportunity to directly study the role discrimination and supply side factors in explaining gender pay gap among recent university graduates.

In the first part of the analysis we use Swedish registered data for the period of 2001 to 2008 to study why young university graduate women receive lower earning than men upon entry into labor market. Given that we are focusing on the first year of labor market entry, measurement issues associated with human capital accumulation process as years of work experience increase are not a major concern in this study. The difficulty to fully control for gender difference in human capital accumulation process, like gender difference in on job training, job interruption and job shopping, often associated with family reasons, has been a major source of disagreement in discrimination studies that include all experience groups. In this study, in an attempt to

² See also Goldin and Rouse (2000) for an example of a natural experiment on discrimination. Åslund and Nordström Skans (2007) investigated the use of anonymous application procedures in combating employer discrimination and found that women under this regime had a higher probability of being offered a job.

minimize the confounding unobserved effect of parental status on gender earning gap³, we excluded individual who already got married and have children upon market entry. It is important to note that about 80 percent of the young⁴ college graduates are single and childless up on labor market entry, and are expected to have children any time soon. The availability of high quality registered data on year of graduation, level of education, and narrowly defined classification of 87 education majors, 113 occupations, 10 sectors of employment gave us a unique opportunity to explore whether gender pay gap still persists for a group with apparently no difference in experience, family status, level and field of education, and job characteristics.

In the second part of our analysis we explicitly focus on discrimination by exploiting the experimental data on hiring of young professional during the first five years into the labor market. In this field experiment we have sent out fictitious job applications to real job openings randomly including information on different types of personal characteristics.⁵ This kind of field experiment⁶ has specifically been designed to test for discrimination in recruitment, but has recently been developed to also study how personal attributes affect the callback for a job interview.⁷ An increasing literature has found that women have different personality traits compared to men, e.g., that women are more risk averse and less competitive, and that these same traits are expected to be important for a successful labor market career. Yet other studies have found that women receive a lower reward than men to observed characteristics as education and work experience (Altonji and Blank, 1999). However, such a result can emerge from employers valuing such attributes less for women, but it could also be explained by unobserved characteristics correlated with these attributes being different for men and women. Therefore we

³ Backer (1985) argues that high commitment of women for house work (after childbirth and marriage) means that women would put less effort at work. This is particularly pronounced in Sweden given the parental leave system that encourages parents to participate in labor force, but at the same time have less work commitment due to childrearing (Albrechet et. al. , 2003)

⁴ College graduates of 2000 to 20007 between the age of 22 to 31 years old.

⁵ These data have been collected within a discrimination project that started in 2006, which measures the extent of ethnic and gender discrimination in hiring by sending fictitious job applications. In this project over 7,000 jobs have been applied to, sending over 20,000 job applications.

⁶ See Riach and Rich (2002) for a summary of the situation test experiments that have been conducted measuring ethnic and gender discrimination in hiring.

⁷ Bertrand and Mullainathan (2004) also use variation in application information to analyze how treatment varies across application attributes.

are particularly interested in whether men and women with some particular personality traits (and characteristics) are valued differently. Also in this part of the analysis we focus on the “family” and ask whether employers are reluctant to hire women who are 25-30 years old and are living in stable relation. Since we have collected information on the sex of the recruiter we also study whether the gender of the recruiter matter for hiring decisions.

The result from registered data shows that on average a single and childless women college graduates earn 11 percent less than men’s income upon labor market entry. Out of the total gap about 76% of the gap is attributed to gender difference in pre-labor market factors that includes level of education, field of education, age⁸ and year of graduation. Out of which gender difference in field of education explains about half of the total gap. Adding controls for job related factors like occupation and sector of employment increased the explained gap to about 80%. The gender difference in earning that is unexplained by the above supply side factors is rather small ranging between 2.2 and 2.7 percent (24 to 20 % of the total gap) for a model with pre-market factors and a model after adding job related factors, respectively.

Our result from the field experiment shows that men and women are treated equally upon entering the labor market. There are no indications that women should be at a disadvantage in the hiring situation, if anything, the evidence points in the opposite direction. This is especially surprising since the recruiters then do not treat women potentially about to have children any different than men in the same age and situation.

The rest of the paper is organized as follows. In Section 2 we give a literature review focusing on why the gender gap could emerge. Section 3 first describes the registered data and then presents the results, while Section 4 does the same with the field experimental data. Section 5 concludes.

2. Literature review of possible explanations

There are many theories being put forward in explaining the gender wage gap, some emerging already in childhood. However, in this literature review we focus only on possible explanations to observed gender differences in labor market outcomes conditional on both gender having the same type of higher education. For pedagogical reasons we divide the proposed explanations along the lines of supply and demand side factors, and finally, in two sub-sections we also report

⁸ Age is included in the regression to control for previous experience before graduation.

results from previous hiring experiments and gender gaps in earnings/wages, the latter only including studies using Swedish data.

Demand side factors – gender discrimination

The first main type of economic discrimination is Beckerian employer, co-worker and customer discrimination (Becker, 1957). Based on this theory, employers are against employing individuals from a certain group because of their negative preferences. Discrimination can therefore occur even if there are no differences in average productivity or productivity variance between men and women. In a similar way, co-workers may have objections to working with members of a certain group and customers may be against engaging in transactions with employees of a given sex.

The other main economic theory is statistical discrimination, where discrimination arises because of incomplete information about the productivity of individuals (Phelps, 1972; Arrow, 1973). If men on average have greater learned abilities in male dominated jobs, employers might as a result expect a male to be more productive in occupations viewed as male jobs. The same applies to women in female dominated occupations. Moreover, women might be viewed as less productive in jobs where firm specific training is important if they are less likely to remain at the firm because of family responsibilities. These cases belong to the first type of statistical discrimination where employers classify individuals on the basis of group belonging, following the productivity of the average member of that group instead of the individual's productivity. The second type of statistical discrimination implies that members of a group are discriminated against because employers view their productivity with different accuracy. In the case of sex discrimination, it may not be obvious why employers would observe male and female productivity with different precision.

Sociologists and psychologists also discuss employer discrimination in hiring, sometimes invoking the same mechanisms as economists. For example, social psychologists discuss the tendency of group members to have a bias in favor of in-group members, such that men would discriminate against women and women against men.⁹ The underlying mechanism might be similar to what Becker had in mind when constructing his model.

Another factor that can lead to discrimination in hiring is cultural beliefs e.g. holding certain jobs for men and women may be simply seen as culturally distasteful (Ridgeway and Correll,

⁹ William Sumner (1992 [1906]) introduced the in- and out-group terminology.

2004). This view allows preferences, or taste for discrimination as Becker expressed it, to vary between jobs.

But men might also be preferred in male occupations if employers act on group belonging, based on mistaken cultural beliefs that incorrectly overestimate the relative productivity of men in male dominated occupations (and the other way around for women). This case appears similar to the first type of statistical discrimination. Nonetheless, some researchers have treated this case separately in order to emphasize the erroneousness of the cultural beliefs held by employers. England (1992) labels this phenomenon error discrimination.

In some cases the theories discussed suggest that men might discriminate against women and women might discriminate against men, which puts the sex of the recruiter or manager into focus. Hultin and Szulkin (1999) find, using Swedish data, that women who work in establishments in which relatively many of the managers are men have lower wages compared to similarly qualified women who work in establishments in which relatively many of the managers are instead women. Of course, such a result could depend upon unobserved variables being correlated with having many men as managers. Related to this research, Rooth (in press) and Agerström and Rooth (in press) show that recruiter's automatic associations, so called implicit bias, towards ethnic minorities and obese individuals explain the difference in callback rates compared to natives and normal weight individuals, while an explicit measure of hiring preferences does not. Although a study for the case of an implicit gender bias in hiring does not exist it is plausible that the same mechanism is at work here. The Implicit Project at Harvard University have in fact shown that an implicit attitude to exist as regards women being associated with as being communal and men as being agentic.¹⁰

Supply side factors

As stated, many alternative explanations have been put forward as to why the gender gap exists due to supply side factors. Here we will shortly review four of those: human capital models, job-shopping models, the overcrowding model and differences in personality traits as self-confidence and competitiveness.

¹⁰ These traits were originally conceptualized as gender-linked traits, with agency representing one aspect of masculinity and communion representing one aspect of femininity.

Human capital models explain the gender wage/earnings gap by gender differences in human capital accumulation. Individuals have different attributes that would affect the choice of human capital investment. Polacheck (1978) argues that since depreciation of human capital is occupation specific and women anticipate more job interruption (perhaps for family reasons), women have the incentive to choose fields of studies (occupations) associated with minimum human capital depreciation. Paglin and Rufolo (1990) on the other hand argue that women's inability to pursue field of education with higher rate of return, fields requiring mathematical ability, are import source of gender difference in college major choices and earning. Both theories suggest that controlling for field of education (occupations) can explain some of the gender difference in earning.

The steeper earnings profile for men during the first few years after entering the labor market could be the result of successful job mobility. If women are constrained in their job choices it could render a gender gap in earnings resulting from differences in job mobility (see Manning and Swaffield, 2008).

The overcrowding model (Bergmann, 1974) suggests that women on average receive lower wages because women "crowd" into a limited number of jobs due to their preference for these jobs or due to their lack of alternatives. This creates an excess supply of workers in these occupations depressing wages for women.

A popular new strand of literature has emerged in experimental economics putting focus on gender differences as regards being competitiveness, which might impact on wage negotiation skills, see Gneezy, Niederle and Rustichini (2003), Gneezy, Leonard and List (2008) and Niederle and Vesterlund (2007).¹¹ It is also found that personality traits as being self-confident etc will impact on wage differences between men and women, see Manning and Swaffield (2008).

The correspondence testing literature

In Europe, Australia and the US, several studies of sex discrimination in employment have been conducted by applying the CT method. For Sweden, Carlsson (2011) studied sex discrimination in the labor market by sending two qualitatively identical applications, one with a female name and one with a male name, to employers that were advertising for labor in Stockholm and

¹¹ Although new in economics gender differences in negotiation situations has a quite long history in social psychology, for an early study see Rubin and Brown (1975) and for a later study see Babcock and Laschever (2003).

Gothenburg (the two largest labor markets in Sweden). Focus is on analyzing whether hiring discrimination is a primary cause of occupational sex segregation. The findings suggest that the bulk of the prevailing sex segregation cannot be explained by discrimination in hiring.

Riach and Rich (1987) used written matching applications to study sex discrimination in Victoria/Australia in hiring computer analyst programmers, computer operators, computer programmers, gardeners, industrial relations officers, management accountants, and payroll clerks. In the male-dominated occupations of computer analyst programmers and gardeners, males had a callback rate that was seven percentage points higher than females. In the remaining occupations, non-significant differences were found.

Neumark, Bank and Van Nort (1996) studied discrimination in restaurants in Philadelphia/US. The experiment included two stages: the interview stage (similar to CT), which determined whether the candidates were called to an interview or not, and the job offer stage (audit testing), where real people attended an interview. Matching pairs, consisting of one female and one male, applied for jobs as waitresses/waiters in restaurants in three different price classes – high, medium and low. Unlike in other studies, jobs were also applied for at restaurants that had not advertised for labor (so-called blind applications). They found that females were discriminated against in the high-price restaurant category, and males tended to be discriminated against in the low-priced restaurants. One interpretation is that preference-based customer discrimination exists, such that customers prefer a male waiter in more luxury restaurants and a female waitress in simpler restaurants, and this preference was taken into account by the recruiter.

Weichselbaumer (2004) conducted a CT in Vienna/Austria by sending written applications to employers that posted vacancy advertisements in daily papers. She tried to emphasize personality in the applications with the aim of influencing sex stereotypes, and thus identifying preference-based discrimination from statistical discrimination. Three applications were sent, one male and two female. The personality of one female was made more masculine, and the other was more traditionally feminine, based on what Weichselbaumer (2004) maintained to be typical male and female qualities. On the basis of this construction, she argued that the masculine female signaled the qualities that are considered to be important in male-dominated occupations. The hypothesis was that if employers in male-dominated occupations discriminated less against the masculine female than against the feminine one, it was a result of less statistical discrimination. However,

the results do not show any significant differences in discrimination vis-à-vis the masculine female and feminine female. She also found that females were discriminated against in the male-dominated occupation of network technicians, and males were discriminated against in the female-dominated occupation secretaries

Riach and Rich (2006) sent matching pairs of written applications to employers in London/UK who advertised vacancies in daily papers and on the Internet. Four different occupational categories were investigated. They found that males were discriminated against in the female-dominated secretarial occupation, and females were discriminated against in the male-dominated engineering occupation. For the mixed occupations of chartered accountants and computer analyst programmers, males were found to be at a disadvantage.

Previous studies on the gender gap in earnings/wages for Sweden

As in the international literature an extensive literature has investigated gender gaps in earnings/wages in the Swedish context, perhaps due to Sweden's gender egalitarian political goals. To not make this section too extensive we focus on studies that we find particularly interesting in relation to our study.

Johansson et. al., (2005) followed the pattern of gender earning gap over the period of 1980's and 1990's using statistics Sweden HINK data. By analyzing the gender earning gap on yearly bases for 1981, 1983-1991 and 1993-1998, they found that unadjusted gender wage gap showed an upward shift during 1990's. They found an unadjusted gender wage gap of 15-18 percent up until 1989 and a higher gender wage gap of 20-25 during 1990's. In their hourly wage regression they controlled for education, quadratic age, industry, occupation, sector, region and citizenship. They found a relatively stable unexplained gender wage gap of 11-15 percent in 1981-1991 and 15-19 percent during 1993-98. Edin et. al., (2002) argues that the upward shift during the 1990's attributed to change in inter-industry mix.

Albrecht et. al., (2003) examined gender earning gap over the distribution of wage gap using 1998 Swedish data. They showed that gender wage gap is lower at the lower and middle part of the wage distribution, but higher at upper part of the distribution. They interpret the result as evidence of strong glass ceiling effect. They also examined the glass ceiling effect for 1980's and 1968 data and showed that glass ceiling effect is less evident in the 1980's and not found in 1968 data. They argued that the observed average gender wage in 1990's is primarily due to the gap at

the top of the wage distribution. Looking at the gender gap by different levels of education their result in Table 3 show that gender wage gap in returns to education is the highest among university graduates.

Evertsson et. al., (2009) investigated gender earning gap over education level in Netherland, Sweden and United States. They found that gender in equality in labor force participation, work hours, occupational segregation and hours work decreases with increasing level of education in three countries. They argued that high employment levels of the highly education as the main factor. On the other hand, they found that gender wage inequality is the greatest among highly educated for Sweden and Netherlands, but the reverse is true for US.

There are a number of Swedish Studies that try to explain the factors behind the persistent gender wage/earning gap in Sweden. Le Grand (1991) used 1981 Level of Living Survey for Sweden to investigate the role women's responsibility for family and house work, women's lower human capital, compensation wage differential and wage segregation. He found that segregation of men and female in different jobs explains a substantial part of the gender earning gap in 1981. Mayerson et. al (2001) use 1970-1990 Swedish data for privately employed worker and found that gender wage gap is small among male and female working in the same occupation and for the same employer. The occupation-establishment gap is the largest, 5 percent, for blue collar and the lowest, 1.4, for white collar jobs. They also showed the segregation of male and female worker by occupation is the most important factor explaining the gender earning gap.

3. Gender differences in earnings using register data

In this section we use registered data to examine gender earning gap for recent college graduates up on entry into labor market. We first describe the data and model specification and then turn to the results focusing on gender difference in earning among recent college graduates with comparable labor market attachment.

3.1 Data Description and Empirical Model Specification

Data

The data used in this study is drawn from Swedish register data of Statistics Sweden (SCB) covering all college graduates observed over the period 2001 to 2008. In this study we consider individual who completed university education between 2000 and 2007 and analyze gender

earning gap one year after labor market entry. The data is restricted to young college graduates who completed university education at age 30 or less. The above age restriction is intended to exclude individuals who may have worked before graduation and focus on graduates who made transition from college to work. In an attempt to obtain a group young male and female college graduates with comparable labor market attachment and commitment we exclude individual who are married and have children upon labor market entry¹². As already mentioned in the introduction, about 80 percent of the young college graduates are single and childless, and are expected to have children any time soon. It is important to notice that we then have excluded individuals (i) who have taken course at university but did not graduate, and (ii) those who have chosen an academic career and have a PhD, (ii) self-employed and sailors. In order to avoid any confounding influence of ethnic discrimination, we restrict our analyses to native Swedish persons, that is, those born in Sweden to Swedish-born parents. Given the above restriction, the remaining sample consists of 135,621 individuals. Out which 96.5 percent of the graduates have positive income one year after graduation. The strong participation in labor market among young college graduates suggest that sample selection associated with low labor market participation is expected to be less problematic in our analysis.

Our measure of annual earnings is income from work calculated based on employers report to tax authority. The annual earning is deflated by consumer price index in 2008 price. Although the earning data obtained from administrative register is the highest quality, the fact that we only have information on annual earning and we are not able to control for part-time workers implies that we find some observation with very low annual earning. In order to minimize the effect of gender difference in working time, we will consider individual whose annual income is above 100,000 SEK in our main preferred specification¹³. Given the above restriction, our database with the preferred annual earning restriction consists of 118,308 individuals out of which 60 percent are women. But, since the above choice is somehow arbitrary we will also report result where we made no restriction and results with minimum annual earning restrictions of 50,000 SEK.

¹² There is a tendency that women who are married and have children tend to spend less hours of work than men due to childbirth and childrearing. Baker (1985) also emphasize that even if men and women work same number of hours, there can still be unobserved differences in the level of commitment and effort due to family reason.

¹³ Antelius, J., Bjorklund, A (2000) compared estimates of earning equation based on annual earning and hourly earning and showed that the estimated coefficient, at least for returns to education, are similar when the restriction on annual earning is set to >100,000 SEK.

The information on gender, which is our main variable of interest, is a dummy variable that takes value of one for female and zero for male. Information on year of graduation is used to identify individuals with one year of potential labor market experience. Since there is a possibility that some individuals may have work experience before graduation, we use age as a proxy to control for work experience before graduation. Our measure of human capital variables include both years and field of education. The level of education is measured in years and varies between two to five years spent in college. The information on field of education is based on detailed three digit category code of 87 types of education. The availability of detail classification of education major allow us to control for gender difference in college major, which is considered to be important in explaining early career gender earning gap among college graduates¹⁴. Type and level of education represent pre-labor market factors where the choices are made before labor market entry. In the empirical analysis, the earning equation that include female, age, level and years of education, and year of graduation fixed effect are referred to us pre-labor market factors.

Our database also consists of detailed information on occupation and sector of employment. The data on occupation is classified based on three digit classification of 113 occupations and we also use 1 digit classification of 10 occupations. The data on sector of employment is classified into 10 categories of employment sectors.

Table 1 provides descriptive statistics of the variables used for the gender gap analysis among recent college graduates. Panel B of table 1 also reports average log annual earning and the distribution of males and females with in different levels of education, field of education, occupation and sector.

Empirical Model Specification

The final model specification used for the empirical gender gap analysis is summarized as follows.

$$\ln(\text{annual earning}) = \alpha + \beta_1 \text{female} + \gamma(\text{Pre} - \text{market factors}) + \delta(\text{job related factors}) + \text{resid}$$

¹⁴ There is growing evidence in the literature that gender difference in college major account for substantial part of gender difference in earning among young college graduates. Some of the studies include: Machin and Puhani (2003), Altonji (1993), McDonald and Thornton (2007), Black et al (2003) and Brown and Corcoran (1997).

Where the coefficient, β_1 , is our variable of interest representing the average gender earning gap. Pre-market factors consist: age, year and type of education, and year of graduation fixed effect. These variables are predetermined before labor market entry and the choices are not expected to be influenced by discrimination in labor market. It is well known in the literature that there is occupation and /or sector segregation by gender and that women are disproportionately represented in low paying occupation and /or sectors. Controlling for the above two job related factors is expect to explain some part of the gender earning gap. But introduction of the above two job related factors in the earning equation may complicate interpretation if they are indirectly affected by discrimination in the labor market. In other words part of the employer gender discrimination would be capture by occupation/sector of employment. In this regard, we will follow the literature where the gender difference in earning after controlling for pre-labor market factors is interpreted as the high bound of unexplained gap and the model that adds job-related factors will be interpreted as lower bound of unexplained gap (Blua and Feber, 1987; and Black et. al., 2008).

3.2 Regression result

Table 2 reports log annual earning difference among recent male and female college graduates one year after labor market entry. Column (1) reports the total gender gap in log annual income. It is evident from the estimated result that there exists a significant gender earning gap among young college graduates during the first year in labor market. We find that on average female graduates earn 11.3 percent less income compared to male graduates. Introducing controls for years of education, age and year of graduation fixed effect, in column 2, marginally reduces the gender earning gap to 8.7 percent. The gender gap further drops down to 2.7 percent once we control for field of education. The significant drop from 8.7 to 2.7 percent suggests that gender difference in education major explain a significant portion of the gender earning gap among young college graduates. The controls in column (3) generally represent pre-labor market factor, which together explain about 8.6 percent earning difference between male and female.

Column (4) to (6) adds somehow controversial job related controls for occupation and sector of employment. As per our previous discussion, the gender earning gap from this regression can be considered as lower bound of unexplained gap. As can be seen from column (4) to (6), adding controls for a broad 10 occupations and more detailed 113 occupations have very small effect on

the gender earning gap. This result is no surprise since we already controlled for type of education, which to a large extent determine the type of occupation a new graduation would work in. Adding control for sector of employment marginally reduced the gender earning gap to 2.2 percent (column 7).

Table 3 investigates the relative importance of various human capital and job related characteristics in explaining the gender earning gap among recent college graduates. Blinder-Oaxaca decomposition (Blinder 1973 and Oaxaca 1973) approach is used to split the earning gap into parts that is “explained” by group difference in productivity related characteristics and the residual part that is unexplained by productivity characteristics. Following Nuemark (1998), coefficient estimates from the pooled sample of males and females are used as a non-discriminatory coefficient in the decomposition. Model I reports gender decomposition result after controlling for pre-labor market factors. In line with our previous result, we find that field of education explains for about half of the total gender earning gap. Pre-labor market factors together explain for about 76 percent of the total gap. After adding job related factor in Model II, the explained gender earning gap increases to 80 percent. This result suggests supply side factors are important in addressing gender inequality even for college graduates with comparable labor market attachment. There remains a small unexplained gender difference in earning with women earning 2.2 to 2.7 percent less than men’s income, which could either be attributed to discrimination or unobserved group differences in gender.

Table 4 reports gender earning gap by year of graduation to show how gender earning gap evolved over years. For each graduates of year 2000 to 2007, we observed the gender earning gap one year after graduation. Although there is some variation over time for the raw gender earning gap, we find little variation when we include pre-labor market and job related factor in Model I and Model II. Looking at results in Model II, one can see that gender earning gap varies between the maximum of 3 percent in 2000 and minimum of 1.8 percent in 2004.

Since our choice of the minimum annual income threshold in the above regressions was somehow arbitrary, in Table 5 we also check how the gender earning gap change when one removes the restrictions. In the table we show how gender earning gap change when the minimum threshold of annual earning gap changes to 50,000 SEK and zero. Interestingly we find that the gender earning gap disappears when the restriction on annual is relaxed.

Gender Earning Gap by Occupational Category

Our objective in this section is to see whether the four sample occupations -teachers, nurses, computer profession and accountants- used for the hiring experimental study are representative of the overall population. The information from census registered data show that individuals working in the above four selected occupations constitutes about 22 percent of graduates working in all occupations in 2007 (the year the experiment was conducted). Nursing is largely dominated by female with share of female accounting for 92 percent of the labor force in nursing occupation. Computer profession on the other hand is male dominated occupation with only 25 percent of the labor force are women. Accountant and Teaching (Grade 7-12) occupations can be categorized as integrated occupation with female labor force accounting for about 51 and 57 percent, respectively.

Table 6 reports gender earning gap for college graduates up on entry into labor market with in the selected four occupation types. The first raw reports total gender earning gap for each occupations. The result shows that there is no significant difference in earning among male and female graduates who are working in teaching and accounting occupation. On the other hand we find a 4.1 and 7.8 percent earning gap among graduates who are working in computer and nursing occupations, respectively. The gender earning gap in computer occupation drops to 2 percent when we control for pre-labor market factors: age, year of education, field of education and graduation year fixed effect (Model I). But the gender earning gap in nursing occupation stood around 7 percent. Finally we add control for sector of employment where we find a marginal drop in computer and nursing to 1.8 and 6.7 percent (Model II). While we still find no gender earning gap in integrated occupation of teaching and accounting. For the four occupations together we find a 3 percent gender earning gap. Although there are some variations in gender earning gap across the occupations, the overall picture for the four occupations is not far from the one found for all occupations. From this exercise we judge that our selected occupations in the field experiment are more or less representative of the overall population.

4. Gender differences in hiring using field experimental data

In this section we first describe the experimental data and then turn to the results focusing on gender differences in hiring. In total, thirteen occupations, selected to be representative for the labor market, were studied within the field experiment. However, for the purpose of this article

we focus exclusively on four of these jobs requiring an academic education: computer professionals, accountants, nurses and teachers (match/science and language in upper level compulsory school and upper secondary school). For these high skill jobs 2,059 applications, 1,030 male and 1,029 female, were sent to 1,223 employers. We will analyze how the gender of the job applicants, as well as of the recruiters¹⁵, influences the probability of being invited to a job interview.

4.1 The field experimental design

The field experiment was conducted between March and November 2007. During this period all employment advertisements in selected occupations found on the webpage of the Swedish employment agency were collected.¹⁶ A clear majority of employers posting vacant jobs at this site want to have the job applications sent in by e-mail only. This facilitates our experimental design attaching information about various characteristics to the job application since it can be done electronically.

Regarding the applications, they had to be realistic while not referring to any real persons. Also, since the competition from other applicants was considerable the testers had to be well qualified. A number of real life (written) applications available on the webpage of the Swedish employment agency were used as templates and adjusted and calibrated for our purposes. Applicants also had varying amounts of work experience in the job applied for and had obtained their education in the same type of school, but at different locations. The application consisted of a quite general biography on the first page and a detailed CV of education and work experience on the second page (see Appendix A and Figure A1 for an example of the first page and Figure A2 for the second page of the job application).

Jobs were applied to all over Sweden, but most frequently in the two major cities of Sweden, Stockholm and Gothenburg. For construction purposes, the applicants always signaled living in Stockholm or Gothenburg, see below for details, for example, living in Stockholm and applying

¹⁵ The sex of the recruiter was obtained from the job. In a few cases, this information was instead obtained either from the firm's homepage or by calling the firm and asking who the recruiter was.

¹⁶ According to labor related laws all new vacancies should be reported to the Swedish employment agency. However, these laws are not enforced and all vacancies are therefore not reported. Still it is the one site where most vacant jobs are to be found.

for a job in Kalmar. Callbacks for interview were received via telephone (voice mailbox) or e-mail. To minimize inconvenience to the employer invitations were promptly declined. We proceed by explaining the design in more detail.

Variation of application information

Typical corresponding testing (CT) studies vary only sex/ethnicity of the applicants by varying their names (see Rich and Riach, 2002). This study takes a more general approach by also randomly varying other attributes. Hence, by this construction it is possible to measure the labor market return to different kinds of skills and attributes. However, the starting point is the same as for the standard CT, that is, to construct the desired general content of the resumes that should not vary. This is achieved at by using applications available on the webpage of the Swedish employment agency as templates, together with our experience from previous conducted field experiments, see Carlsson and Rooth (2007), Rooth (2009), and Carlsson (in press). In footnote 6 we discussed this data having its origin in a large gender and ethnicity discrimination project. Hence, at this stage we also decided upon the names of the applicants, that is, having either a Swedish sounding male or female name (or a Middle Eastern sounding name – not being used here), varying over applications and being the same as in the previous experiments by Carlsson and Rooth (2007, 2008).

After sketching this general frame of the applications we decided upon thirteen variables that could be important for the chance of being invited for interview. Formal education is varied such that the applicant can have either precisely the required education or to be overeducated. If the applicant is overeducated he/she is so in another field than the one searching for a job in. Having worked during summer holidays when in school, or not, takes two different values depending on whether that is the case or not. Also, the candidates could have spent a year during secondary school in a US High school, or not.

Then two variables tell the personality of the candidate, that is, basically following the Big Five taxonomy using the two of its five categories - extroversion and agreeableness, see Borghans et al. (2008). In principle the personality categorization in the Big Five is achieved at by relating a persons' personality to certain traits, being described by single words. However, these highest level categories of extroversion and agreeableness can be further divided and it is these lower level categories that we use words describing traits from. In this respect the text

signaling these personality categories have also been developed to somewhat comply also with the male/female stereotype presented within social psychology in that men are agentic and women communal (see Eagly and Sczesny, 2009).¹⁷

Being categorized as an *agreeable* person has both a moral and social dimension, that is, the person states that it is important to care about others and likes to work in a group, while the opposite category more clearly states that it is important to get the job done, that is, explicitly stating having a clear focus on the job, and stating that it is not essential to have to work in a group.¹⁸ Hence, to some extent this categorization also conform with the agentic/communal personality distinction. Being categorized as an *extrovert* person is done in a similar fashion and we have decided upon closely relating it to the lower level category *competence*. While we would expect employers to prefer a person with higher overall competence it is not for certain that employers prefer persons that explicitly state that in the job application.¹⁹ Of course, it is difficult to clearly describe a clear personality with just a few sentences, especially since personality is multi-dimensional. Therefore we decided upon making the categories within agreeable/extrovert as far apart as possible without making them stand out as odd applications/personalities.

¹⁷ See footnote 9.

¹⁸ The text for *agreeable* is "My friends and former colleagues would probably state that I am a warm and social person who gets along great with others. Also, I think it is important to ensure people's needs, and not just focusing on the economic side. I have a strong empathy with people who are less fortunate than myself and I am active in the Red Cross relief work.", while the text for the opposite is "I usually do not sit and keep my opinions to myself but rather instead say what I think. Some of my former colleagues would probably call me a bit stubborn, but I believe it is important to be correctly understood and that the job gets done. I do not mind working alone, since it is then sometimes easier to concentrate on the job task".

¹⁹ The text for *competence* is "I am used to put great effort into work and I always try to do my best. I strive to be as precise as possible so the work tasks need not to be repeated. My old work mates would probably say that I am a person who always manage to get the job done. In addition, I would describe myself as a hardworking and tenacious (sw: uthållig) person who withstand stress.", while for the opposite it is "I really like to work but at the same time I think it is important to keep a balance between work and leisure. The best days are the ones when I feel I have done my job and yet have energy to be active in my spare time. It is not important for me to be the best at work and my colleagues would probably describe me as a pretty relaxed."

In an ethnic discrimination context it is believed that the neighborhood in which the applicant lives in is important and is therefore included. This variable can take three values depending on the economic segregation in the area. Three additional variables relate to the applicant's unemployment experience. One variable indicates whether the applicant has been unemployed in-between different jobs, another whether the applicant was unemployed after finishing education or went directly to a first job, and finally, whether the applicant is unemployed or not at the moment, where the length of current unemployment spell varies between 3 and 9 months. In this context the number of previous employers is varied as well, being either 1 or 3. Our measure of job experience, the total length being employed, is further varied between two and five years (see Appendix A and Figure A3 for a graphical picture of the design for these labor market experience variables).

Another variable that is of interest is of course the age of the applicant. It is however impossible to estimate a separate age effect by this construction since age is perfectly correlated with some of the other variables that we vary and given the values of these variables and the fact that we assume that individuals graduate from secondary school at the age of nineteen the current age of the applicant is automatically given.²⁰ In the empirical analysis we take two different roads. In the first set of results (Table 5-9) we focus on the return to those characteristics being displayed on the first page of the job application, which includes the age of the applicant. This information is what first is visible to the employer and is signaled in the text. In the second set of results (Table 10-11) we instead focus on the return to characteristics displayed on the second page, exchanging age for the other variables being related to it as work and unemployment experience etc. This information is not as easily grasped as the first page information and requires to be more carefully processed. The above mentioned attributes make up a total of eleven different ones being manipulated in the job application. We now turn to the final attribute, leisure sports.²¹

²⁰ The age of the applicant can be found by calculating backwards from the date when the resume was constructed, using time spent in employment, time spent in unemployment (before, after and in-between employment), time spent in university education and time spent abroad during secondary school. For example, if the applicant finishes secondary school in 2003 (the year he or she turns nineteen) and then is unemployed for a year, finds a job and works for three years until "today" (summer 2007), the person must be 23 years old.

²¹ As previously stated thirteen variables were randomly attached. However, in Rooth (2010) it was found that one of the sport variables, whether the person previously in life was engaged in the sport on a (highly) competitive level or

As found in Rooth (2010) men being engaged in leisure sports have a higher probability to receive a callback for interview than men not being engaged in sports.²² In order to get an idea on this issue for this sample we have included information on whether being engaged in different sports. As individual sports we included tennis, golf, running/jogging and swimming and as team sports we included soccer and basketball. Figure A4 in Appendix A gives the experimental design as regards the share of each sport and (previous) effort level.²³ Within the group not having sports in their application about half have the information “On evenings and weekends I enjoy my leisure time. Since we like to cook, and to have nice evenings at home, we often invite friends over for dinner” attached to it (the benchmark case in the regressions), while the other half signal being engaged in cultural activities.

Construction of applications

It was a demanding task to construct resumes with this great variation in attributes. First an application had to be divided into modules, in principle one module corresponding to each variable mentioned above. A module could look somewhat different depending on what variable it was linked to. Typically it could be a paragraph in the personal letter or a part of the CV, or in some cases both. For example, the number of employers corresponds to a paragraph in the letter telling the names of the employers and what tasks were performed at the employers, as well as items in the CV telling the employers names as well as the dates of employments.

Also, to utilize the number of advertised jobs to a maximum it was necessary to be able to send several applications to the same employer. To avoid suspiciousness the applications

not, was not found to affect the callback rate and has been left out of the analysis in this article. Signalling being engaged in a sport on a competitive or purely recreational level was expected to capture if recruiters value the motivation and competitiveness of job applicants arriving through sports.

²² The reason for including information on leisure sports in the job application was to investigate whether such personal information could lessen the extent of ethnic discrimination.

²³ For example, competitive soccer is signaled by the following sentences: ” I spend quite a lot of time on physical activities when I don’t work. Today I play in a lower soccer league than I used to, but it still involves training and matches several times a week”. The recreational soccer player is instead signaled by: ”Regarding my other interests I like to engage in recreational sport activities in order to stay in shape. For instance, during the summer season I play soccer in *Korpen* (a well known recreational sport league in Sweden).” The other sports are signaled in a similar way, see Rooth (2010).

therefore had to be constructed in several versions with different typeface and layout. Three different versions with different looks depending on typeface and layout were allowed for. Hence, in addition to the thirteen randomly attached variables discussed above, the application version constitutes yet another variable, as does the order in which the applications are sent (if several are sent to the same employer), the city in which the applicant lives (Stockholm or Gothenburg) and the occupation the applicant applies for a job in.

For practical reasons the applicants always had postal addresses in Stockholm or Gothenburg. For example, it was only possible to have a limited number of telephone numbers with automatic answering machines for employers to call and therefore only a limited number of area codes as well. As stated previously, applications were not sent only to employers in these cities but to employers located everywhere in Sweden. When necessary a sentence was added to the application telling that the applicant was just about to move to the area where the employer was located. If the location of the employer was in Gothenburg then the applicant always lived in Gothenburg as well. If the location of the employer was somewhere else in Sweden, including Stockholm, then the applicant always lived in Stockholm.

The procedure of building a personal letter and a CV depending on randomized values of the variables had to be done in a very systematic way to avoid mistakes and to gain efficiency. Therefore a computer program was written in the programming language Visual Basic and the program was designed to do the following. The program started its execution by reading its input given by the research assistant. The inputs consisted of group belonging of the candidate (Swedish sounding male or female name or a Middle Eastern sounding name), the occupation to apply for job in, what layout to use on the application and in what city in Sweden the employer was located.

The second step was to randomly assign values to all variables that could vary. Depending on the values of the input the program randomly selected the corresponding modules and generated a complete application consisting of a personal letter on one page and a CV on another page. The program was extensively tested in order to verify that all modules fitted together and that the result always was a realistic application.

Finally, the generated application was sent to the employer with email by the research assistant. In those cases where several applications were sent to the same employer the order of

them was book kept (automatically by the computer program). That made it possible to control for sending order since it may influence the chance of being invited.

The e-mail addresses and the telephone numbers (including an automatic answering service) aiming for employers to make contact were registered at a large Internet provider and a phone company. From previous conducted field experiments we know that no (or very few) employers make contact through regular mail and therefore fictitious postal addresses are used in this study.

4.2 Results

In this section we analyze the effect of the manipulation of gender, and gender interacted with various characteristics, on the probability of being called for interview using probit regressions (reporting marginal effects from the `dprobit` command in Stata and clustering standard errors on the job level).

We start with the return to the first page information, that is, age, personality, leisure activities etc. First we study whether recruiters value male and female job applicants differently, and if so, does it vary by type of characteristics. Then we turn to if the gender of the recruiter affect the evaluation of the same variables. Finally, we repeat the analysis but then instead focus on the second page information, that is, decomposing age into its different experience components.

4.2.1 First page information

In this section we start with showing the results when using quite simple models and including as few variables and as many observations as possible to gain precision, and then improve upon the questions being asked by dividing the data further and including more variables, see Table 5-9.

The analysis starts by regressing the callback indicator on age, personality attributes, gender of the job applicant as well as of the recruiter for the full sample of male and female job applicants. The first column of Table 7 show results when merging all four occupations and reveals that applications with an *agreeable* personality attached to it have approximately a six percentage point higher probability of being called for interview compared to applications with the non-agreeable (more individualistic) information.²⁴ Also, the results do not indicate any gender discrimination in hiring favoring males since female applicants in fact have approximately

²⁴ Throughout the article we always include occupation fixed effects when the occupations are being merged.

a four percentage point higher probability to receive a callback for interview compared to male applicants. The return to the other variables in the table are not found to be statistically significant. When estimating the same model by occupation we find that women are preferred as computer specialists and accountants, while for the other two occupations we find no gender difference in callbacks for interview. A similar result is found for *agreeableness* in that it is a preferred personality trait for nurses and teachers, while being unimportant for computer specialists and accountants. We now turn to the more interesting case where we separately estimate the models of Table 7 by gender.

Even if sometimes being estimated with a low precision it is clear that the overall impression is that an agreeable personality is valued for both gender across the different occupations, see Table 8. A personality signaling extrovert/competence receives a high hiring premium of about twelve percentage points for male computer specialists, while it is a penalty of about the same magnitude for male accountants. It is also the case that male nurses are valued very positively if being engaged in sports in that they have an eighteen percentage points higher probability to receive a callback for interview. Interestingly, the gender of the recruiter shows a quite consistent pattern in that female recruiters, compared to male recruiters, more often give a callback to interview to male applicants and less frequently to female applicants. Next we put more structure in trying to find statistically significant patterns for the impact of the recruiters' gender.

In the analysis of Table 9 we regress the callback dummy on the female indicator, the female recruiter indicator and the interaction of the two. The estimate of the female indicator in this case captures the female-male difference in the callback rate when a male is responsible for recruiting, while the estimate of the interaction variable captures to what extent this difference is different if a female instead is responsible for the recruiting. The first column shows that for all four occupations being merged male recruiters are nine percentage points (26%) more likely to give a callback to a female compared to male job applicant. Female recruiters depart in this respect and do not treat male and female job applicants differently. However, albeit being imprecisely estimated, this pattern varies by occupation. For computer specialists and accountants both male and female recruiters prefer female over male job applicants by about twelve percentage points. However, the interpretation of the results for accountants is soon to be altered. None of the estimates for the last two occupations are statistically significant.

In Table 10 we interact all variables included in Table 6 with the female recruiter indicator for all occupations being merged as well as for each occupation, except nurses.²⁵ Hence, we now ask whether male and female recruiters value different characteristics among the job applicants when hiring, without separating it by gender of the job applicants. Interestingly, the story just told changes somewhat for accountants and becomes statistically significant for teachers. For accountants, opposite to the previous table, it is in fact only male recruiters who prefer female job applicants, while female recruiters do not make such a distinction. For teachers the opposite holds in that male recruiters do not make a distinction between male and female job applicants, while female recruiters prefer male job applicants. Hence, somewhat contradictory to results found in social psychology as regards social attraction (as being different from sexual attraction) it seems as the opposite sex attracts.

For the other variables the action going on is limited. However, ten out of the twelve interaction effects for the personality attributes have a magnitude above five percentage points. Hence, the results are indicative of that female recruiters seem to value a greater age, a result we will return to when we disaggregate age into its components in the next section, and having an agreeable personality.

To extend the analysis even further and asking if female and male recruiters value the attributes of male and female job applicants differently is to ask a lot out of the data. The reader should have this in mind when interpreting the results. In fact, even if the point estimates are large the precision in these are low and none of the estimates is found to be statistically significant. The first two columns of Table 11 just replicate the same two columns of Table 10. Although suggestive, three interesting findings come out of this analysis. Age again come out as being a more important characteristic for female recruiters, especially when evaluating female job applicants. When applicants signal their *competence* it is valued positively by female but not by male recruiters if the person applying for the job is male (compare column 3 and 4), but is then valued negatively of about the same magnitude by the female recruiter if the job applicant instead is a female (compare column 5 and 6).²⁶ Last, female recruiters value female applicants being

²⁵ Since the share of female recruiters in nursing amount to 87 percent we probably have too little variation to receive precision, especially when we include more variables as we do here, and the estimates become very large and imprecise. These results are available upon request.

²⁶ The estimate being 0.085 in column 4 and -0.088 in column 6.

engaged in recreational sports quite positively having a twelve percentage point higher probability to receive a callback for interview compared to male recruiters.

The most striking feature of the results in this section is that women are not discriminated against in the hiring process, and are in some occupations in fact even preferred over men. This is especially interesting since the first page information states that the female applicant is 25-31 years old and is living in a stable relationship without children. It would not be too farfetched to imagine employers to expect this woman to sometime in the near future to have kids. Even so, she is not discriminated against. In this respect it is even more surprising that it is especially (older) male recruiters that prefer female applicants. Hence, despite expectations of homosocial preferences and alike these results instead support, if anything, the view that the opposite sex attracts. Another fact, that also is evident for the results from a number of other CT experiments, is that employers do not seem to act in a clear and systematic way when evaluating the information in the job applications since no variables stand out as clearly being preferred. In the next section we will especially put a gender perspective on how employers value common labor market experience variables as unemployment and work experience histories.

4.2.1 Second page information

When replicating the model in Table 7 but instead of age incorporating labor market variables we find that the impact of work experience, which varies from 1 to 5 years, is nonlinear in the sense that it is the distinction between 1 and 2-5 years that matters, see Table B2 in Appendix B.²⁷ To make the estimates of this variable interpretable when we pose more restrictions on the models we decided upon including it as a dichotomous variable throughout the analysis.²⁸

In Table 12 two variables measuring time being unemployed are included. The variable *Unemployed after education* is intended to capture scarring in the sense that the application signal that the person was unemployed for a whole year after graduating (with the benchmark being no time gap between graduating and start of the first job), while the variable *Contemporary unemployed* captures that the person, when applying for the job, has been unemployed for at least

²⁷ To save space the estimates of the other included variables are not reported. Basically they do not change from Table 7-11, which would be expected given the experimental design.

²⁸ As stated above it is indeed surprising that employers, for instance, on average do not put a different value on five as opposed to two years of work experience.

six months, being signaled by when the last job ended (with the benchmark being searching on the job or having been unemployed for less than 3 months). While most of the estimates of these variables have a negative sign, the precision of the estimates are extremely low. When all occupations are being merged the estimates indicate that female applicants have a higher penalty than male applicants if having been unemployed after graduating, while the opposite is indicated for contemporary unemployment. Hence, since these patterns “cancel out” we can not judge whether there is a general gender pattern as regards being unemployed.

Although there is some variation among the occupations the overall impression is that male and female applicants are valued similarly on work experience. In the lower panel of the table three other types of experiences that are expected to be important for jobs that require a higher education are included. *Being overeducated* states that the person has an additional university education, in any of sociology, political science, law, history or engineering. *Summer job when in school* signals additional experience, while *US High school* signals that the person went to such during a year when in secondary school.

Again the precision of the estimates is low while the magnitude of the estimates is high, but even so about half of the estimates have a negative sign, which is opposite to what we would expect for these variables. Albeit these quite discouraging results for these models were we focus on if male and female applicants are perceived differently on labor market experience characteristics we continue to models focusing on if the gender of the recruiter matters for the evaluation of these same characteristics.

When merging all four occupations we do not find any evidence of that male and female recruiters value different characteristics since none of the estimates in the second column are statistically significant, see Table 13. A similar result emerge by occupation in that only three out of eighteen interaction effects are statistically significant, and one of those has the wrong expected sign.

The results in this section are very provocative if one believes that employers make decisions when hiring based on easily observed information on accumulated work experience and previous unemployment spells. They just do not. It is also surprising that employers do not value persons who have the motivation and drive to spend a year on their own in the US as a teenager (16-17 years old). Perhaps this type of result could be explained by that these human capital variables do

not affect the hiring probability at the margin when applications already signal being of high quality.

5. Conclusion

In this study we set out to investigate why university educated women receive lower earnings in the Swedish labor market. The different data sources from registered data and hiring experiment gave us a unique opportunity to directly study the discrimination and supply side channels of the gender pay gap among recent college graduates.

In the first part of the analysis we used detailed registered data to study the source of gender difference among young childless and single college graduates of native Swedish men and women upon entry into labor market. We found that women on average earn 11 percent less income than men. When we control for only pre-labor market factor, age, level of education, field of education and year of graduation fixed effect, the gender earning gap significantly drops to 2.7. The decomposition of the total gender earning gap shows that field of education only explains about half of the gender earning gap, and together with other pre-market factors they explain about 76 percent of the total gap. Adding controls for occupation and sector of employment increased the explained gap to about 80%. The gender different that is not explained by the above factors is rather small ranging between 2.2 and 2.7. This result suggest that supply side factors are important in addressing gender inequality even among college graduates with comparable labor market commitment.

The results from a hiring experiment hint that employer discrimination is not the explanation. Women do not receive a lower callback for interview even despite the fact that they signal being in prime childbearing age and living in a relation, but not yet having children. We also investigated whether men and women are valued differently on characteristics and whether the sex of the recruiter matter for these outcomes. We find that male recruiters value female applications higher than male applicants, while this is not the case for female recruiters. Another interesting result, although suggestive, is that female recruiters tend to reward outgoing/competitive male applicants but punish female such.

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Table 1: Descriptive Statistics**Panel A: Summary Statistics for log annual earning age and years of education**

	Female			Male			Gender
	Obs.	Mean	s.d.	Obs.	Mean	s.d.	Gap
Earning	71124	7.84	0.272	47184	7.95	0.327	0.11
Age	71124	26.59	1.988	47184	27.11	1.852	0.51
Year of Education	71124	3.47	0.606	47184	3.66	0.576	0.20

Panel B: Mean log earning and Distribution of females and males with in different levels of education, field of education, occupation and sector

	Mean log earning	% of Females	% of Males
<i>Years of Education (after high school)</i>			
2	7.79	1.79	1.77
3	7.81	53.77	33.72
4	7.94	40.33	60.85
5	8.11	4.1	3.66
<i>Field of Education</i>			
Technology and Manufacturing	7.958	12.95	46.77
Health and social care	7.856	28.19	8.55
Social science, law, commerce, administration	7.849	26.97	24.20
Agricultural and forestry and veterinary	7.831	1.51	1.52
Science, mathematics and computing	7.803	5.42	8.00
Education and teacher training	7.764	21.11	8.11
services	7.758	0.93	0.76
Humanities and arts	7.620	2.91	2.08
Unspecified	7.606	0.01	0.01
<i>Occupation</i>			
Legislators, senior officials and manager	8.046	0.95	1.24
Professionals	7.943	41.51	48.02
Technicians and associate professionals	7.878	39.30	27.85
Craft and related trades workers	7.823	0.26	1.45
Plant and machine operators and assemble	7.807	0.46	2.76

Clerks	7.766	7.09	5.41
Skilled agricultural and fishery worker	7.686	0.22	0.39
Elementary occupations	7.681	1.01	1.24
Service workers and shop sales workers	7.663	6.08	4.35
Unspecified	7.801	3.12	7.29
Sector			
Limited company, not publicly owned	7.954	34.65	62.5
Other companies, non-publicly owned	7.941	1.39	2.3
State enterprise	7.940	0.05	0.1
County	7.897	17.67	6.6
Municipal-owned businesses and organization	7.885	2.22	1.5
State-owned enterprises and organization	7.875	2.84	3.4
State and Local Government	7.818	9.51	11.4
Primary Municipal Administration	7.762	27.58	9.9
Other Organizations	7.751	3.58	2.2
Other public institutions	7.735	0.51	0.3

Table 2: Gender Earning Gap among Recent College Graduates of 2000 to 2007

VARIABLES	Dependent Variable: Log annual Earning 1 Year After Graduation					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.113*** [0.002]	-0.087*** [0.002]	-0.027*** [0.002]	-0.026*** [0.002]	-0.025*** [0.002]	-0.022*** [0.002]
Controls:						
Age	No	Yes	Yes	Yes	Yes	Yes
Graduation Year	No	Yes	Yes	Yes	Yes	Yes
Years of Education	No	Yes	Yes	Yes	Yes	Yes
Field of Education	No	No	Yes	Yes	Yes	Yes
10 Occupations	No	No	No	Yes	No	Yes
113 occupations	No	No	No	No	Yes	No
Sector	No	No	No	No	Yes	Yes
Constant	7.950*** [0.002]	7.505*** [0.014]	7.316*** [0.014]	7.272*** [0.015]	7.319*** [0.015]	7.160*** [0.015]
Observations	118,308	118,308	118,308	118,308	118,308	118,308
R-squared	0.034	0.112	0.213	0.262	0.296	0.286

Note: The unit of observation is college graduates of 2000 to 2007 observed one year after graduation. For instance, for graduates of 2000 we observed their income in 2001 and for graduates of 2007 we observe their income in 2008. All graduates are pooled together in the above OLS regression. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Oaxaca Decomposition of Gender Earning Gap among Recent College Graduates

	Model I		Model II	
	Coef.	in % of raw Gap	Coef.	in % of raw Gap
<i>Total Gender Gap</i>	0.113		0.113	
<i>Explained Gap</i>	0.086***	76.0	0.091***	80.4
Age	0.010***	9.0	0.009***	8.0
Year of Education	0.021***	18.5	0.016***	14.4
Field of Education	0.056***	49.2	0.035***	30.6
Graduation Year	-0.001***	-0.7	-0.001***	-0.8
Occupation	-	-	-0.003***	-2.6
Sector	-	-	0.035***	30.9
<i>Unexplained Gap</i>	0.027***	24.0	0.022	19.6

Note: The unit of observation is college graduates of 2000 to 2007 observed one year after graduation. Following Nuemark (1998), coefficient estimates from the pooled sample of males and females are used as a non-discriminatory coefficient in the decomposition. Model I reports decomposition result for the earning equation that only controls for pre-labor market factors, age, years of education, field of education and graduation year. While Model I adds job related factors, occupation and sector. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Gender Pay Gap for Recent College Graduates by Year of Graduation

VARIABLES	Year of Graduation							
	2000	2001	2002	2003	2004	2005	2006	2007
<i>Total Gender Gap</i>								
Female	-0.173*** [0.005]	-0.132*** [0.005]	-0.090*** [0.005]	-0.079*** [0.005]	-0.088*** [0.005]	-0.106*** [0.005]	-0.122*** [0.005]	-0.126*** [0.005]
<i>Model I: Pre-market factors</i>								
Female	-0.033*** [0.005]	-0.025*** [0.006]	-0.024*** [0.006]	-0.032*** [0.006]	-0.022*** [0.006]	-0.029*** [0.005]	-0.029*** [0.005]	-0.023*** [0.005]
<i>Model II: adds job related factors</i>								
Female	-0.030*** [0.005]	-0.021*** [0.005]	-0.018*** [0.005]	-0.026*** [0.006]	-0.018*** [0.006]	-0.024*** [0.005]	-0.024*** [0.005]	-0.019*** [0.005]
Observations	13,848	14,016	14,162	14,217	14,662	15,752	16,273	15,378

Note: For each cohorts of college graduates, the log annual earning is observed one year after graduates. For instance, for 2000 graduates we observed the their log annual earning in 2001 and for 2007 graduates we observe log annual earning in 2008. Model I reports gender earning gap after controlling for pre-labor market factors: age, years and field of education. While Model II adds job related factors, occupation and sector. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Table 5: Gender Pay Gap using different Minimum Annual Earning Threshold

VARIABLES	Annual Earning Above 50,000 SEK			No Earning Restriction		
	Total Gap	Model I	Model II	Total Gap	Model I	Model II
Female	-0.096*** [0.002]	-0.014*** [0.003]	-0.012*** [0.002]	-0.049*** [0.004]	0.026*** [0.005]	0.015*** [0.004]
Observations	124,188	124,188	124,188	130,501	130,501	130,501
R-squared	0.014	0.176	0.269	0.001	0.138	0.270

In the first three columns we report gender earning gap for individual with annual earning greater than 50,000 SEK. While the last three columns report gender earning gap for individual with annual earning above zero. The controls included in model I and model II are the same as table 4. Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Table 6: Labor Market Entry Gender Earning Gap for College Graduates by Occupation

Dependent Variable: Log annual Earning

VARIABLES	Teacher	Computer	Accountant	Nursing	Four
<i>Total Gap</i>					
Female	-0.004 [0.009]	-0.041*** [0.007]	-0.019 [0.012]	-0.078*** [0.006]	-0.087*** [0.004]
<i>Model I: Pre-Market factors</i>					
Female	-0.002 [0.008]	-0.020*** [0.007]	-0.003 [0.012]	-0.070*** [0.006]	-0.034*** [0.004]
<i>Model II: Adds sector of employment</i>					
Female	-0.002 [0.008]	-0.018** [0.007]	-0.002 [0.012]	-0.067*** [0.006]	-0.030*** [0.004]
Observations	3,498	6,597	1,641	10,389	22,125
% of female					

Robust standard errors in brackets
 *** p<0.01, ** p<0.05, * p<0.1

Table 7. The return to (some) worker characteristics – “First page information”. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations	Computer specialists	Accountants	Nurses	Teachers
	A	B	C	D	E
1. Age (*10)	-0.008 (0.057)	-0.019* (0.010)	0.023** (0.012)	-0.021 (0.016)	0.007 (0.009)
2. Personality attributes					
Agreeableness	0.062*** (0.021)	0.028 (0.035)	0.014 (0.048)	0.117* (0.063)	0.088*** (0.034)
Extroversion/competence	0.018 (0.022)	0.073 (0.041)	-0.047 (0.045)	0.021 (0.062)	0.018 (0.036)
Recreational sports	-0.013 (0.027)	0.005 (0.047)	-0.080 (0.054)	0.117 (0.077)	-0.015 (0.046)
Cultural activity	0.005 (0.034)	0.038 (0.063)	-0.056 (0.061)	0.025 (0.099)	0.020 (0.057)
3. Gender					
Female	0.037** (0.017)	0.118*** (0.030)	0.074** (0.032)	-0.022 (0.048)	-0.032 (0.027)
Female recruiter	0.000 (0.027)	-0.055 (0.051)	0.049 (0.054)	0.019 (0.113)	0.000 (0.040)
N	2,059	653	399	286	721
Callback for job interview (%)	34.3	37.5	26.6	52.1	29.7

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group using the model $\text{Prob}(\text{Callback}=1) = a + b*X + c*\text{Female} + d*\text{Female recruiters}$. The regression reported in the first column also include occupation fixed effects.. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.

Table 8. The return to (some) worker characteristics – “First page information” - by sex of the job applicant. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations		Computer specialists		Accountants		Nurses		Teachers	
	Male applicant	Female applicant	Male applicant	Female applicant	Male applicant	Female applicant	Male applicant	Female applicant	Male applicant	Female applicant
	s	s	s	s	s	s	s	s	s	s
	A	B	C	D	E	F	G	H	I	J
1. Age (*10)	-0.005 (0.081)	-0.008 (0.083)	-0.006 (0.014)	-0.030** (0.015)	-0.002 (0.015)	0.052*** (0.018)	-0.031 (0.025)	-0.010 (0.027)	0.017 (0.013)	-0.002 (0.013)
2. Personality attributes										
Agreeableness	0.070** (0.029)	0.053* (0.031)	0.071 (0.052)	-0.003 (0.056)	-0.064 (0.059)	0.106* (0.065)	0.142* (0.085)	0.082 (0.086)	0.111 (0.049)	0.062 (0.048)
Extroversion/competence	0.043 (0.030)	-0.002 (0.030)	0.115** (0.052)	0.022 (0.055)	-0.103* (0.062)	-0.010 (0.067)	0.064 (0.087)	-0.038 (0.086)	0.051 (0.050)	-0.011 (0.048)
Recreational sports	-0.030 (0.039)	0.007 (0.038)	-0.084 (0.072)	0.069 (0.067)	-0.080 (0.076)	-0.081 (0.083)	0.177* (0.106)	0.035 (0.115)	-0.028 (0.067)	-0.006 (0.060)
Cultural activity	0.011 (0.051)	0.000 (0.049)	-0.014 (0.094)	0.074 (0.089)	0.015 (0.093)	-0.110 (0.092)	0.116 (0.131)	-0.098 (0.143)	-0.007 (0.083)	0.048 (0.079)
3. Gender of the recruiter										
Female recruiter	0.037 (0.032)	-0.038 (0.033)	-0.042 (0.057)	-0.066 (0.061)	0.075 (0.062)	0.005 (0.067)	0.108 (0.131)	-0.067 (0.128)	0.046 (0.050)	-0.040 (0.048)
N	1,030	1,029	326	327	198	201	144	142	362	327
Callback for job interview (%)	32.8	36.5	31.6	43.4	22.7	30.3	53.5	50.7	31.2	43.4

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group and by the gender of the job applicants using the model $\text{Prob}(\text{Callback}=1) = a + b*X + c*\text{Female recruiters}$. The regressions reported in the first two columns also include

occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.

Table 9. The recruiter's gender and gender based decisions when hiring. Marginal effects (percentage points).

	All occupations	Computer specialists	Accountants	Nurses	Teachers
Female	0.087*** (0.023)	0.121*** (0.035)	0.116*** (0.046)	0.111 (0.102)	0.013 (0.039)
Female recruiter	0.050 (0.032)	-0.050 (0.060)	0.099 (0.066)	0.103 (0.125)	0.037 (0.048)
Female*Female recruiter	-0.099*** (0.031)	-0.010 (0.063)	-0.083 (0.059)	-0.158 (0.113)	-0.082 (0.050)
# observations	2,059	653	399	286	721
Share of female recruiters	0.48	0.28	0.43	0.87	0.53
Callback rate	0.35	0.38	0.27	0.52	0.30

Note: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group using the model $\text{Prob}(\text{Callback}=1) = a + b*\text{Female} + c*\text{Female recruiter} + d*[\text{Female*Female recruiter}]$. The regression reported in the first column also includes occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.

Table 10. The return to (some) worker characteristics – “First page information” - by sex of the recruiter. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations		Computer specialists		Accountants		Teachers	
	X	Female recruiter *	X	Female recruiter * X	X	Female recruiter *	X	Female recruiter *
	A1	A2	B1	B2	C1	C2	D1	D2
1. Age (*10)	-0.084 (0.078)	0.180 (0.114)	-0.025** (0.012)	0.028 (0.024)	0.030* (0.016)	-0.013 (0.024)	-0.001 (0.013)	0.017 (0.018)
2. Personality attributes								
Agreeableness	0.040 (0.028)	0.044 (0.043)	0.011 (0.040)	0.067 (0.084)	-0.074 (0.064)	0.218** (0.110)	0.132*** (0.046)	-0.083 (0.063)
Extroversion/competence	0.022 (0.031)	-0.007 (0.044)	0.093** (0.047)	-0.079 (0.088)	0.001 (0.061)	-0.098 (0.078)	-0.032 (0.054)	0.096 (0.079)
Recreational sports	-0.033 (0.036)	0.051 (0.056)	0.011 (0.054)	-0.029 (0.108)	-0.126 (0.077)	-0.107 (0.115)	-0.004 (0.061)	-0.031 (0.090)
Cultural activity	0.010 (0.047)	-0.006 (0.068)	0.063 (0.075)	-0.095 (0.124)	-0.096 (0.075)	0.115 (0.154)	0.071 (0.086)	-0.089 (0.099)
3. Gender								
Female	0.085*** (0.023)	-0.097*** (0.031)	0.119*** (0.036)	-0.011 (0.065)	0.130*** (0.047)	-0.109* (0.056)	0.009 (0.039)	-0.087* (0.051)
Female recruiter	-0.457 (0.255)	-	-0.551 (0.296)	-	0.351 (0.648)	-	-0.375 (0.468)	-
N recruiters of each sex	1,074	985						
Callback for job interview (%)								

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group using the model $\text{Prob}(\text{Callback}=1) = a + b \cdot X + c \cdot \text{Female recruiter} + d \cdot [X \cdot \text{Female recruiter}]$. The regression reported in the first two columns also includes occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job. Nurses did not produce reliable estimates, all ranging [.200-.800], and have been discarded.

Table 11. The return to (some) worker characteristics – “First page information” - by sex of the recruiter, male and female job applicants separately. Marginal effects (percentage points).

Applicant characteristics (X)	All job applicants		Male job applicants		Female job applicants	
	X	Female recruiter * X	X	Female recruiter * X	X	Female recruiter * X
	A1	A2	B1	B2	C1	C2
1. Age (*10)	-0.084 (0.078)	0.180 (0.114)	-0.051 (0.111)	0.096 (0.163)	-0.120 (0.109)	0.271 (0.167)
2. Personality attributes						
Agreeableness	0.040 (0.028)	0.044 (0.043)	0.063 (0.041)	0.015 (0.060)	0.019 (0.042)	0.065 (0.063)
Extroversion/competence	0.022 (0.031)	-0.007 (0.044)	0.002 (0.042)	0.085 (0.063)	0.041 (0.042)	-0.088 (0.058)
Recreational sports	-0.033 (0.036)	0.051 (0.056)	-0.025 (0.055)	-0.012 (0.078)	-0.044 (0.051)	0.118 (0.080)
Cultural activity	0.010 (0.047)	-0.006 (0.068)	0.057 (0.073)	-0.087 (0.089)	-0.030 (0.064)	0.071 (0.105)
3. Gender						
Female	0.085*** (0.023)	-0.097*** (0.031)	-	-	-	-
Female recruiter	-0.457 (0.255)	-	-0.241 (0.421)	-	-0.700* (0.261)	-
N	1,074	985	535	495		
Callback for job interview (%)						

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each gender of the job applicants using the model $\text{Prob}(\text{Callback}=1) = a + b*X + c*\text{Female recruiter} + d*[X*\text{Female recruiter}]$. All regressions include occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.

Table 12. The return to (some) worker characteristics – “Second page information (CV)” - by sex of the job applicant. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations		Computer specialists		Accountants		Nurses		Teachers	
	Male applicants	Female applicants	Male applicants	Female applicants	Male applicants	Female applicants	Male applicants	Female applicants	Male applicants	Female applicants
	A	B	C	D	E	F	G	H	I	J
1. Labour market exp.										
Unemployed after education	-0.016 (0.037)	-0.053 (0.035)	0.022 (0.070)	-0.062 (0.064)	-0.050 (0.068)	0.129 (0.091)	-0.084 (0.108)	0.052 (0.104)	-0.012 (0.063)	- 0.173*** (0.048)
Experience 2 -5years	0.071* (0.042)	0.087** (0.042)	0.100 (0.068)	0.019 (0.082)	0.076 (0.082)	0.263*** (0.060)	-0.071 (0.127)	-0.136 (0.119)	0.129* (0.067)	0.182*** (0.052)
Contemporary unemployed 6-9m	-0.039 (0.032)	-0.013 (0.033)	-0.063 (0.056)	-0.071 (0.061)	-0.055 (0.062)	0.140** (0.072)	0.001 (0.107)	-0.024 (0.092)	-0.031 (0.053)	-0.051 (0.051)
2. Other experience										
Overeducated	-0.046 (0.034)	0.033 (0.036)	-0.100* (0.058)	-0.056 (0.068)	0.059 (0.068)	0.133 (0.084)	-0.133 (0.104)	0.010 (0.109)	-0.012 (0.058)	0.067 (0.057)
Summer job when in school	-0.003 (0.031)	-0.014 (0.031)	-0.054 (0.052)	0.002 (0.057)	0.113 (0.070)	0.003 (0.068)	0.042 (0.093)	-0.069 (0.090)	-0.020 (0.050)	0.003 (0.049)
US high school	0.025 (0.037)	-0.032 (0.039)	-0.060 (0.064)	-0.052 (0.070)	0.150 (0.080)	-0.036 (0.089)	0.216** (0.099)	-0.034 (0.119)	-0.036 (0.061)	0.001 (0.066)
N	1,030	1,029	326	327	198	201	144	142	362	359
Callback for job interview	32.8	36.5	31.6	43.4	22.7	30.3	53.5	50.7	31.2	28.1

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group and by gender of the job applicants using the model $\text{Prob}(\text{Callback}=1) = a + b*X + c*X$; X=Female recruiters and the other variables from Table 3. The regressions reported in the first two columns also include occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.

Table 13. The return to (some) worker characteristics – “Second page information (CV)” - by sex of the recruiter. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations		Computer specialists		Accountants		Teachers	
	X	Female recruiter *	X	Female recruiter	X	Female recruiter *	X	Female recruiter *
	A1	A2	B1	* X	C1	C2	D1	D2
1. Labour market experience								
Unemployed after education	-0.035 (0.034)	-0.001 (0.053)	-0.038 (0.053)	0.071 (0.115)	0.087 (0.072)	-0.073 (0.098)	-0.121** (0.051)	0.048 (0.092)
Experience 2 -5years	0.061 (0.040)	0.050 (0.064)	-0.005 (0.064)	0.307** (0.128)	0.096 (0.086)	0.160 (0.175)	0.185*** (0.056)	-0.074 (0.107)
Contemporary unemployed 6-9m	-0.045 (0.033)	0.043 (0.050)	-0.094* (0.049)	0.072 (0.100)	0.015 (0.067)	0.027 (0.106)	-0.056 (0.057)	0.028 (0.083)
2. Other experience								
Overeducated	-0.020 (0.034)	0.032 (0.051)	-0.128** (0.050)	0.250** (0.116)	0.115* (0.071)	-0.107 (0.077)	0.054 (0.057)	-0.046 (0.072)
Summer job when in school	-0.019 (0.030)	0.023 (0.045)	-0.048 (0.046)	0.099 (0.093)	0.001 (0.064)	0.062 (0.101)	0.038 (0.051)	-0.070 (0.066)
US high school	0.008 (0.038)	-0.024 (0.054)	-0.041 (0.057)	-0.038 (0.107)	0.147* (0.084)	-0.169* (0.067)	-0.025 (0.064)	0.012 (0.093)
N recruiters of each sex	1,074	985	471	182	226	173	341	380

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each occupational group using the model $\text{Prob}(\text{Callback}=1) = a + b \cdot X + c \cdot \text{Female recruiter} + d \cdot [X \cdot \text{Female recruiter}]$. All regressions include occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job. Nurses excluded.

APPENDIX A – THE EXPERIMENTAL DESIGN

Figure A1. First page application exemplar: Computer specialists; searching on the job – he is employed, 27 years old, signals competence, an agreeable personality, and being engage in sports.
(own translations into English from Swedish)

Hi,

My name is Karl Johansson and I am 27 years old. I live in Stockholm together with my girlfriend Anna. I work as a system designer at Telenor AB in an environment based on win2000/SQL Server. I am part of three different projects and my work contains development, maintenance and every day problem solving. Development work is made in ASP, C++ and Visual Basic and we use the development platform .Net and MS SQL. In addition I have experience in HTML, XML, J2EE and JavaScript. As a background I have an exam as a computer scientist from Uppsala University.

I am used to put great effort into work and I always try to do my best. I strive to be as precise as possible so the work tasks need not to be repeated. My old work mates would probably say that I am a person who always manage to get the job done. In addition, I would describe myself as a hardworking and tenacious person who withstand stress.

My friends and former colleagues would probably state that I am a warm and social person who gets along great with others. Also, I think it is important to ensure people's needs, and not just focusing on the economic side. I have a strong empathy with people who are less fortunate than myself and I am active in the Red Cross relief work. Regarding my other interests I like to engage in recreational sport activities in order to stay in shape. For instance, during the summer season I play soccer in *Korpen*

I look forward to being invited for interview and I will then also bring my good certificates and diplomas.

Best regards

Karl Johansson

Figure A2. Second page – CV - application exemplar: 5 years of work experience, no scarring – found job directly after graduating in 2002, 3 employments, and unemployed in between jobs.

(not translated into English)

CV

Namn: Karl Johansson
Bostad: Eiravägen 4 F
18260 Djursholm
Telefon hem: 08 - 208 127
E-post: ErikJohansson4@hotmail.com

Utbildning (Education) ***1998 - 2002***

Uppsala Universitet, Uppsala,
Datavetenskapliga programmet,
magisterexamen (160p)

Ht 95 - Vt 98

Blackeberg gymnasium, Stockholm
Naturvetenskapligt program

Tidigare Arbete (Job history) ***0506 - 0704***

Telenor AB, anställd som
systemutvecklare

0306 - 0411

Dynacom AB, anställd som
systemutvecklare/programmerare

0204 - 0301

Freba AB, anställd som
systemutvecklare/webutvecklare

Övrigt (Other)

Språkkunskaper Svenska och Engelska
Körkort Ja
Operativsystem: Win 95/98/ME/2000/XP
Programmeringsspråk: JSP, C++, Visual Basic, Erlang, Small
Talk, ASP
Applikationsprogram: Word, Excel, Microsoft Visual Studio 6.0,
.Net, MatLab.
Databaser: scriptspråket SQL,
programmeringsgränssnittet ODBC.

Figure A3. Construction of labor market experience variables in the experiment.

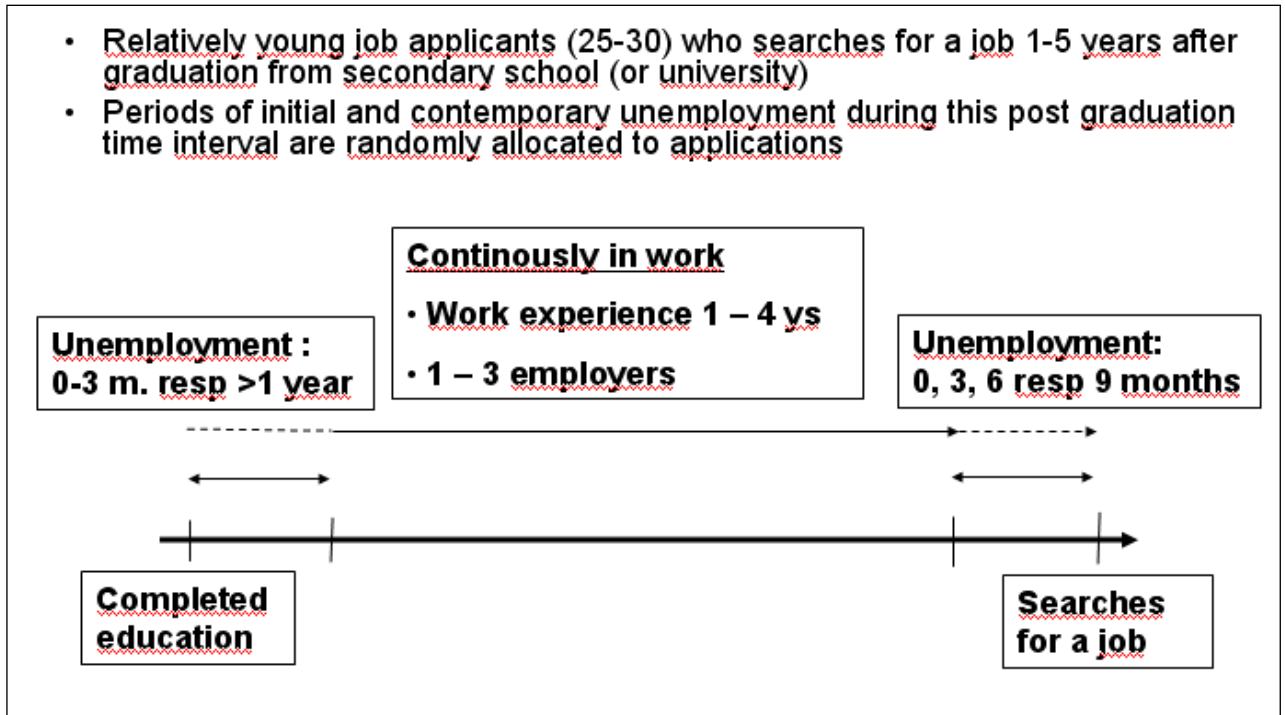
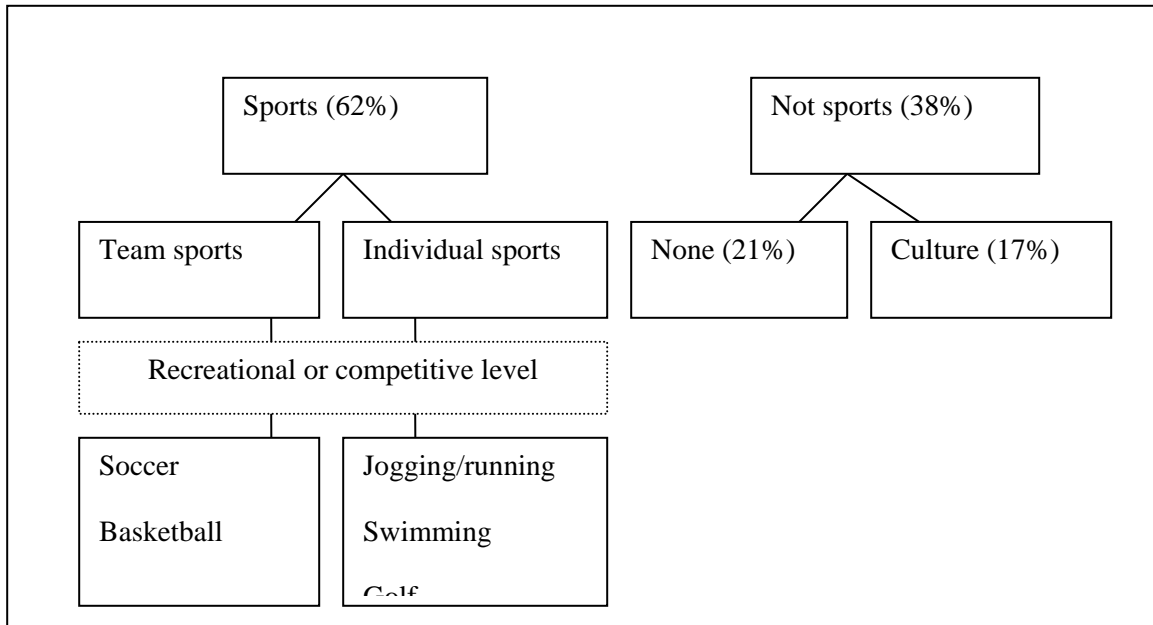


Figure A4. Experimental design of leisure sports.



TABLES

Table B1. Correlation matrix of the included variables in the experiment and their means. 2,059 observations.

Variables	Mean	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Callback for interview (0/1)		-.030	-.021	.029	-.008	.003	.004	.060	.020	.008	-.029	.012	.014	.028
2. Unemployed after school (0/1)		-	.031	-.058	-.005	.027	-.007	-.039	.032	.024	-.019	-.018	.026	-.026
3. Contemporary unemployed ¹⁾			-	.004	-.026	-.039	-.007	.015	.035	-.002	-.003	-.009	.000	.026
4. Experience ²⁾				-	-.002	.003	.002	.030	.001	-.021	.030	-.009	.058	-.017
5. Overeducated (0/1)					-	.004	.017	.009	-.016	-.017	.031	.020	-.012	-.013
6. Job when in school (0/1)						-	-.035	-.014	.019	.000	-.013	-.014	-.026	-.020
7. US Highschool (0/1)							-	.013	.014	-.019	.005	.008	.031	.012
8. Agreeableness (0/1)								-	-.023	.012	-.040	.021	.015	.018
9. Extroversion (0/1)									-	.019	.013	-.016	-.007	-.014
10. Individual sports (0/1) ³⁾										-	-.443	-.375	-.028	.015
11. Team sports (0/1) ³⁾											-	-.237	-.018	.003
12. Cultural activity (0/1) ³⁾												-	.054	.017
13. Bad neighbourhood (0/1) ⁴⁾													-	-.250
14. Good neighbourhood (0/1) ⁴⁾														-

Notes: This table shows the success of the randomization since the correlations do not exceed $|.006|$, except then for those variables that are correlated by design, see the table notes 3 and 4.

¹⁾ In the analysis *contemporary unemployed* is defined as being unemployed for 6 or 9 months, while the benchmark is not unemployed or being unemployed for three months.

²⁾ *Experience* varies between 1 to 5 years and is in the empirical analysis divided into four indicator variables. For experience being 3 to 5 years the experimental design also randomly varies having 1 or 3 previous employers and being unemployed in between jobs or not. Hence, experience at 1 and 2 years depart by design somewhat from experience at 3 years or above.

²⁾ Since one can only be unemployed in between jobs if having more than one job this variable only varies among those having three previous employments.

³⁾ The indicators on being engaged in sports or cultural activities are correlated by design since they are belonging to the same underlying random variable, which explains their high correlation.

⁴⁾ The indicators on living in a certain neighborhood are correlated by design since they are belonging to the same underlying random variable, which explains their high correlation.

Table B2. The return to (some) worker characteristics – “Second page information (CV)”. Marginal effects (percentage points).

Applicant characteristics (X)	All occupations	Computer specialists	Accountants	Nurses	Teachers
	A	B	C	D	E
1. Labour market experience					
Unemployed after education	-0.038 (0.025)	-0.033 (0.046)	0.040 (0.057)	-0.024 (0.071)	-0.097** (0.039)
Experience 2 years	0.099*** (0.037)	0.057 (0.064)	0.196** (0.095)	-0.154 (0.106)	0.205*** (0.065)
3 years	0.056 (0.040)	0.055 (0.071)	0.116 (0.096)	-0.086 (0.112)	0.129** (0.072)
4 years	0.087** (0.041)	0.002 (0.072)	0.139 (0.099)	0.030 (0.115)	0.185*** (0.075)
5 years	0.089** (0.045)	0.121 (0.081)	0.064 (0.106)	-0.231* (0.115)	0.200*** (0.080)
Contemporary unemployed 6-9m	-0.026 (0.024)	-0.058 (0.042)	0.037 (0.051)	-0.004 (0.072)	-0.039 (0.039)
2. Other experience					
Overeducated	-0.008 (0.025)	-0.073 (0.046)	0.068 (0.052)	-0.070 (0.073)	0.028 (0.039)
Summer job when in school	-0.004 (0.022)	-0.020 (0.039)	0.032 (0.049)	-0.013 (0.063)	-0.006 (0.035)
US high school	0.002 (0.027)	-0.058 (0.047)	0.054 (0.060)	0.091 (0.074)	-0.021 (0.044)
N	2,059	653	399	286	721
Callback for job interview (%)	34.7	37.5	26.6	52.1	29.7

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions for each group of native males and females, ethnic minority males, and then both male groups merged together. Model A divides sports into team and individual sports, while Model B includes an indicator variable for each sport, and in addition controls for cultural activities, work experience, and the full vector X including all attributes discussed in

Table B3. The return to (some) worker characteristics – “Second page information (CV)” - by sex of the recruiter, male and female job applicants separately. Marginal effects (percentage points).

Applicant characteristics (X)	Men and women		Male applicants		Female applicants	
	X	Female recruiter *	X	Female recruiter * X	X	Female recruiter *
	A1	A2	B1	B2	C1	C2
1. Labour market experience						
Unemployed after education	-0.032 (0.034)	-0.030 (0.062)	0.019 (0.051)	-0.077 (0.069)	-0.076 (0.048)	0.065 (0.076)
Experience 2 -5years	0.033 (0.038)	0.044 (0.068)	0.060 (0.058)	0.037 (0.092)	0.049 (0.059)	0.079 (0.093)
Contemporary unemployed 6-9m	-0.044 (0.032)	0.039 (0.050)	-0.075* (0.044)	0.084 (0.071)	-0.018 (0.045)	0.017 (0.068)
2. Other experience						
Overeducated	-0.023 (0.034)	0.008 (0.058)	-0.029 (0.047)	-0.041 (0.068)	-0.007 (0.050)	0.092 (0.076)
Summer job when in school	-0.020 (0.030)	0.026 (0.044)	0.027 (0.043)	-0.065 (0.058)	-0.067 (0.042)	0.107* (0.065)
US high school	0.004 (0.037)	-0.017 (0.054)	0.037 (0.055)	-0.021 (0.072)	-0.007 (0.052)	-0.046 (0.079)
N recruiters of each sex	1,074	985	535	495	539	490

Notes: This table reports marginal effects for the probability of being invited for an interview based on probit regressions divided by gender of the job applicants using the model $\text{Prob}(\text{Callback}=1) = a + b*X + c*\text{Female recruiter} + d*[X*\text{Female recruiter}]$. All regressions include occupation fixed effects. *, **, and *** denote the 10, 5 and 1 percent significance level, respectively. Reported standard errors (in brackets) are adjusted for clustering on the job.