Racial and Ethnic Discrimination in the Labour Market: A Literature Review

BACHELOR'S THESIS
ERASMUS SCHOOL OF ECONOMICS

Anne Dieuwke Haagsma
377999 | ROTTERDAM; AUGUST 2015
SUPERVISOR: SUSANNE NECKERMANN; DEPARTMENT: GENERAL ECONOMICS

Table of Contents

Introduction

Discrimination has been and remains today one of the greater struggles communities face. Discrimination is not a problem of the past. Even living in modern, multicultural and diverse cities, people are confronted with their being different. Take some recent news: the Sikh postman not being allowed to drive regular routes at Disney World (Brait, 2015), the opposition against the legalisation of same-sex marriage across the United States (BBC, 2015), or Boris Johnson being accused of breaching gender discrimination laws after defending discriminating comments made by academic Tim Hunt (Gutterridge, 2015). With nationalistic parties such as LePen's *National Front* (FN) in France, *Pegida* in Germany and Wilders' *Partij voor de Vrijheid* (PVV) in the Netherlands becoming more outspoken in recent years, foundations of tolerance and diversity are being undermined.

The question in this paper is, then, whether this is also seen in the labour market. Discrimination in the labour market can occur in many forms: differential treatment on the basis of gender, disability, ethnicity or age, for example. This paper will focus on ethnic and racial discrimination in the labour market. Race typically refers to physical characteristics such as skin colour or facial features and ethnicity refers to cultural factors such as nationality and religion. The general definition for labour market discrimination used is: "a situation in which persons who provide labour market services and who are equally productive in physical or material sense are treated unequally in a way that is related to an observable characteristics such as race, ethnicity or gender" (see Altonji and Blank, 1999, p. 3168)

Research on discrimination in the labour market has been carried out by economists and their experimental techniques have been published in economic journals since the 1980s (Riach & Rich, 2002). All these years later, there is a substantial body of literature to analyse. Many countries in which such research has taken place have passed anti-discrimination laws. It seems, however, that these have not been successful in reducing discrimination in the labour market.

The aim of this paper is to collect and summarize independent research done across the world to find the presence of ethnic and racial discrimination in the labour market and any patterns or trends emerging. This will be done in the form of an extensive literature review. This will add to the existing research by providing a thorough examination of the literature available on racial and ethnic discrimination in two different stages of employment: finding a job and, for workers with a job, the wage received. By analysing and comparing the outcomes in these stages, conclusions may be drawn

applying to a wide range of the labour market. Moreover, this literature review will compare research done across countries, not only allowing an international overview but a broader and more comprehensive understanding of ethnic discrimination in the labour market, too.

The literature review will be structured as follows. After the introduction, section 1 will provide an explanation of the baseline theories of discrimination in the labour market. Section 2 is dedicated to the examination of ethnic discrimination in the initial stages of the hiring process, beginning with an explanation of the nature of the experiments and then discussing the existing literature. Section 3 will cover wage differentials. The review will be concluded with a summary and discussion of the findings.

Section 1: Types of Discrimination in the Labour Market

On average, natives hold more favourable positions in labour markets across the world than ethnic minorities. After controlling for differences in human capital, like education or experience, substantial ethnic differentials in both employment and wages remain. When looking purely at observed wages of natives and ethnic minorities, for example, one can see native wages are often higher (source). Furthermore, unemployment rates amongst immigrants are higher than amongst natives. This phenomenon has been and is still of interest to researchers. There has been economic interest in the detection of discrimination in labour markets since the late 1950s (Becker, 1957). Studies done in many countries since provide overwhelming evidence of the existence of discrimination in labour markets. Discrimination occurs when members of a minority group are treated less favourably than members of a majority group with identical productive characteristics. Any form of this is forbidden by law in many of the countries in which the studies that will be discussed take place. It is, however, difficult to detect.

1.1 Taste-Based Discrimination

One of the earliest economic models of discrimination was developed by Becker (1957) in *The Economics of Discrimination*. In this neoclassical model, employers have a certain prejudice that attaches a disamenity value to employing those workers at the receiving end of this prejudice. Discrimination thus stems from individual preferences. Each employer maximises their utility function that looks as follows:

$$U = F(N_W + N_B) - w_W N_W - w_B N_B$$

consisting of the firm's production function and the utility obtained from employing workers from the majority and minority groups N_W and N_B, expressed in monetary terms. Deducted from this is the wage paid to members of each group, where w_W is the wage of the white worker and w_B is the wage of the black worker.

Say the employer is prejudiced against blacks. He will perceive the hourly wage of a black worker as being $(1 + d)w_B$, higher than that of a white worker. The optimal amount of workers hired therefore depends on d, the discrimination coefficient. It is assumed that workers in both groups are perfect substitutes in the sense that their marginal productivity is identical (Borjas, 2012). A non-discriminatory, profit-maximising employer would hire the worker with the lowest wage. A discriminatory employer, however, is willing to forego potential productivity or profit to avoid hiring a black worker and causes segregation of the workforce. The black worker must either accept a lower wage or increase his productivity should he wish to work at the discriminating firm. In a

competitive market equilibrium where each workers earns a wage equal to his marginal productivity, discriminatory employers cannot pass the disamenity value of their prejudice onto the black worker as non-discriminatory firms will arbitrage their prejudice. He can only indulge his prejudice at his own cost.

There is a substantial body of literature in which this type of discrimination has been measured. Taste-based discrimination may show up through preferential hiring or in wage differentials of minority and majority groups, as will be discussed in sections 2 and 3 of this paper.

1.2 Statistical Discrimination

There was some critique on Becker's model by the 1970s. Economists are generally wary of manipulating the utility function to explain behaviour. The conclusion that discrimination would be competed away in equilibrium also makes it difficult to test the model empirically. Moreover, this conclusion "predicts the absence of the phenomenon it was designed to explain" (Arrow, 1972). Neither does Becker provide an explanation as to why discrimination exists. A new model was developed by Arrow and Phelps (1972) based on the premise that an employer assesses a worker without possessing complete information on their expected productivity. The employer can observe characteristics such as age, gender, race and ethnicity. The worker can only signal his skills or productivity through for example his resume or interview.

As firms do not have access to complete information on an applicant, they tend to rely on observable characteristics that they believe are correlated with the unobservable characteristics, in this case expected productivity, as sorting criteria (Eriksson & Lagerström, 2007). Statistical discrimination occurs when an employer treats the worker based on his membership of a specific group and his knowledge of that group's history (Borjas, 2012).

Section 2: Ethnic Discrimination in the Initial Stages of the Hiring Process

2.1 Field Experiments

2.1.1 Situation Tests

To identify the presence and extent of discrimination in the hiring process, several studies have been carried out using field experiment data. A common form these experiments take is a situation test. This type of test uses a personal approach and involves direct contact with a firm. Applicants, professional actors in some studies, from a majority and a minority group are matched as closely as possible in qualifications, background, appearance, demeanour and style. These matched pairs are referred to as testers. There is extensive training and coaching beforehand to help testers give almost identical answers to questions asked and to try to eliminate personality differences. The only distinguishing quality that remains should be ethnicity. They then contact an employer or apply for a job. An advantage of this approach is the access it gives to a wide range of job quality. Entry-level jobs, for example, often require personal contact in the hiring process.

One form of personal approach is application via telephone. A positive response may be recorded when the employer shows an interest in the tester, whether for an interview, job or further contact. For these tests it is important that the testers have distinctive names and accents to signal their ethnicity. In Britain, for example, discrimination against West Indians and Pakistanis for skilled manual jobs has been detected in this manner (Hubbuck & Carter (1980); Brown & Gay (1985); McIntosh & Smith (1974)). As these studies, although valid, are very small-scale and older, the results will not be discussed in detail.Studies conducted in the United States finds that African-American ethnicity cannot be distinguished over the telephone easily (Placeholder1).

The second form involves direct contact with the firm. This may involve a response to an advertisement, whether written, by telephone or in person, followed by an interview or it may involve applicants approaching a firm unsolicited to inquire after job openings (Riach & Rich, 2002). Some early studies using this method all find evidence of discrimination in a series of jobs ranging from gardener to computer analyst programmer, see (Brown & Gay, 1985) and (Hubbuck & Carter, 1980)

Now, the handful of studies that has been carried out in the United States in recent years will be summarized. An early paper using a larger-scale, more refined form of situation testing than those

mentioned above was carried out in Washington D.C. (Bendick, Jackson, & Reinoso, 1994). Six teams of white and African American testers completed a total of 149 applications. The testers selected were university and college undergraduates and applied for randomly selected entry-level jobs. In this paper, the net discrimination is calculated by subtracting the proportion of applicants in which only minorities receive an offer from the proportion of job applicants in which only majority applicants receive an offer. This approach has been widely used in the papers founding the situation testing approach. They find less favourable treatment of African Americans in comparison with equally qualified whites.

An important situation study conducted in this field more recently was done by Pager, Western and Bonikowski (2009). This was the first study to look at a matched set of three ethnic groups: white, black and Latino. An interesting aspect of this study is the comparison of minority groups with a white applicant just released from prison. Carried out in the low-wage labour market in New York City, matched high-school graduate testers applied for 340 jobs over nine months. Two teams were set up, each containing one black, white and Latino tester. The Latino tester was identical to the other two in the sense that he spoke unaccented English, had no Spanish language skills and was a US citizen. 1 team compared the minorities with a white tester with a clean record and the other team compared the minorities with a white tester convicted of a drug felony. Each team applied to jobs advertised within a 24-hour period. Their most striking result is that black and Latino applicants with clean records have the same labour market chances as a white applicant just released from an 18-month prison sentence. This study was based on an earlier study conducted by pager in Milwaukee (Pager, 2003). Although not directly focused on ethnic discrimination, this study does conclude that employers are already reluctant to hire blacks over whites. A criminal record, then, has a larger effect for blacks than for whites in the hiring process. This effect is estimated to be as large as 40 percent. In other words, the employer forms an association between race and crime.

The greatest critique on situation testing comes from Heckman and Siegelman (1993). A drawback of using a personal approach is the difficulty of matching the testers. There is an ongoing discussion in the literature about the extent to which testers should be matched. Should the majority and minority tester be of identical height, for example, if some minorities are simply known to be shorter?

Furthermore, many critics of situation testing have raised doubts on its ability to prove the presence of discrimination – many other factors could have played a role in the employer's decision . There is the danger that discrimination is overstated (Ward, 1969). There is always a random aspect in hiring.

If unobserved variables are significant, this does not automatically mean there is discrimination present. There are many other factors that could have led to the given test results. Heckman and Siegelman agree with this criticism. They elaborate on this point, stating that the success of a situation test depends on the underlying unobservable characteristics of testers being identical. Doubts about the matching process raise this issue of other unobservable factors being important and difficult to control for. There is, however, very little mentioned in the literature as to what these other unobserved factors may be. Testers themselves can also influence results through behaviour or even just through expectations. A minority tester might, for example, set out to prove discrimination by behaving a certain way during the interview. This could happen even subconsciously. The tester may expect to be treated differently from the majority applicant and act as such.

2.1.2 Correspondence Tests

Another form field experiments can take is that of the correspondence test. This involves matching and sending multiple resumes of fictitious applicants in response to real job vacancies to test for discrimination at the initial stage in the hiring process. These resumes are identical in all but the ethnicity of the applicant, which is randomly assigned to the resumes. The positive response native applicants get in comparison to the ethnic minority applicants is used as a measure of discrimination. The advantage of such a study is that the native-sounding and foreign-sounding names are randomly assigned, so that name effects are completely isolated from all other effects and the effect of a difference in response can only be due to discrimination. It offers a solution to the matching problem of situation tests, as the applicants can be made truly identical. The treatment and control variables are thus defined more absolutely. Furthermore, there is a set procedure to the setting up and sending of resumes preventing subconscious manipulation of the study. This was also a problem occurring in many situation tests. Minority participants, knowing the purpose of the study, might manipulate it as such to prove discrimination.

An experiment in this form was first introduced in England in an attempt to find discrimination in managerial and administrative jobs (Jowell & Prescott-Clarke, 1970). This experiment distinguished between different ethnic groups to separate foreign from colour. Bertrand and Mullainathan conducted a very influential study in the United States more recently with the purpose of finding racial discrimination on the part of employers (Bertrand & Mullainathan, 2004). They wanted to examine whether, when presented African American and white applicants with similar observable characteristics, employers would favour the white applicant. Sending nearly 5000 resumes and

covering a large spectrum of job quality, they found that white resumes receive about fifty percent more callbacks for an interview than African Americans do. In fact, having a white name yields as many more callbacks as an additional eight years of experience. By varying the quality of the resumes, they also discovered it is not only more difficult for African Americans to find a job across all occupation levels, but it is also more difficult to improve their employability. Namely, the reward to a better resume was much smaller for African American applicants than for white applicants.

While many studies look at the single biggest ethnic minority in the countries in which their research is based, a study conducted in seven major British cities across nine occupations looked at various minority groups (Wood, Hales, Purdon, Sejersen, & Hayllar, 2009). Although a major weakness of this research was its timing: right in the middle of the worst of the crisis which would have impacted any positive response, they found ethnic minorities would have to send sixteen applications to get a callback where a white applicant would have to send nine.

In Greece, too, evidence of discrimination in recruitment can be found using a correspondence test (Drydakis & Vlassis, 2010). In this case, having an Albanian identity reduces a worker's change for an invitation to an interview by 21.4 percentage points. A similar experiment in Sweden saw a callback rate of applications with a Swedish name 50 percent higher than for those with a Middle Eastern sounding name (Carlsson & Rooth, 2007). Another interesting aspect of this experiment was the analysis of workplace and recruiter characteristics correlated with ethnic difference in the callback rate. By collecting company and recruiter information, they found a relationship between ethnic difference in callbacks and the sex of the recruiter, as well as the number of employees in the workplace. A male responsible for choosing applicants to interview will call a Middle Eastern man with a lower probability than a female would. Large firms tend to have a comprehensive recruitment process and therefore lower discrimination.

In Toronto, Canada, immigrants of various racial or ethnic backgrounds like Indian, Pakistani and Chinese seem to struggle in the labour market (Oreopoulos, 2011). Of interest here is that Canada mostly attracts high-skilled immigrants. Oreopoulos manipulates a wider set of characteristics on resumes he sends in reply to online job advertisements. He randomly varies the names with that distinguish ethnicity but also whether the applicants have obtained Canadian or foreign education and job experience. There is evidence of discrimination in the Toronto labour market. He finds that 15.7 percent of natives with English-sounding names receive callbacks, whether only six percent of foreign-sounding names receive a callback. Also, being a foreigner, work experience in Canada

seems more important to employers than Canadian education and will increase the callback rate. Recruiters were asked to explain these findings and said they think a name is correlated with language proficiency but this is not supported by the empirical evidence.

A similar study conducted in Germany to examine the hiring opportunities of individuals with a Turkish migration background also finds evidence for ethnic discrimination (Kaas & Manger, 2012). This research focuses on firms that offer internships to students of economic and management sciences, in other words focusing on the high-skilled segment of Germany's labour market. They submitted two types of applications, one with additional information about the candidate's personality in the form of reference letters. They, too, found that a German (native) name was more likely to receive a callback, but that this difference disappears when the employer is supplied with additional information on the candidate.

Arceo-Gomez and Campos-Vazquez (2014) conduct one of the first correspondence studies on discrimination in a developing country, Mexico. Here, the native population consists of a mixture of colour and characteristics, with no clear racial distinction, not even by name. Instead of varying the names in this correspondence study, the researchers vary the photographs that accompany the resume. They use three racial phenotypes: white, mestizo (mixed-race) and indigenous. The research covers college graduates with minimal work experience. Using regression analysis they find applicants of indigenous appearance are discriminated against: callback rates decrease for darker applicants with a significant effect for women but only a marginally significant effect for men.

Riach and Rich (2002) recommend publishing full details of any field experiment, meaning procedures followed and the complete results. Not all studies adhere to this. Because results have not been recorded consistently across studies, it is difficult to compare them. Care should also be taken in the interpretation of results of these field experiments. Take, for example, the case where both applicants are rejected or receive no callback. Does this signal equal treatment, or does this hold no information on discrimination?

All in all, there is solid evidence that ethnic discrimination is *present* in the hiring process. The evidence is not as strong, however, in explaining the *type* of discrimination. Brown and Gay (1985) refer to these experiments as a minimum measure of discrimination. Another drawback of field experiments involves the possibility that the employing firm has more data on worker characteristics than the researcher, so these experiments can never be conducted in a fully controlled environment.

A laboratory experiment, on the other hand, offers researchers more control. These will perhaps shed more light on the source of discrimination and under which circumstances it is more likely to occur.

2.2 Other Approaches

The studies that will be discussed in the following section have a basis in psychology experiments. The focus of such experiments often lies on the effect of belonging to a certain group towards the members of one's own group and members of other groups (Anderson, Fryer, & Holt, 2006). The division of these groups is usually random, although participants are told it is because of some objective criteria. Consider a very simple example: Vaughan, Tajfel and Williams (1981) divided classes of children of different ages into a 'red' group and a 'blue' group. The division was based on the children's preference for paintings they were shown and neither group was told they were superior to the other. When asked to divide pennies between people in their class using coin cards, the children consistently gave more money to those belonging to their group. This effect of group bias held across sex and age groups. A same type of format, albeit more elaborate, can thus be used to investigate group bias among ethnic groups.

Fershtman and Gneezy examine ethnic discrimination within Israeli Jewish society (Fershtman & Gneezy, 2001). Using game theory, they test for the presence of ethnic discrimination, whether this reflects group bias or systematic discrimination against one or several ethnic groups and whether it is a taste for discrimination (Becker, 1957) or ethnic stereotyping. To test for discrimination they set up a trust game with Israeli students. They find a systematic mistrust of Eastern immigrants, as they also discriminate against their own group. The dictator game shows that the discrimination in the trust game is due to ethnic stereotypes, as this is eliminated in the dictator game and both groups of immigrants received similar amounts. A third game is an ultimatum game where they find the direction of discrimination is reversed: the other immigration group now receives less. Moreover, they find that ethnic discrimination mostly comes from males. This is in line with findings of the field experiments.

Another game approach using students as subjects combines a linear public goods game with a sorting task (Castillo & Petrie, 2010). In a simple public goods game, subjects privately choose an amount to put in a public pot. The amount in the pot is multiplied by a factor between one and the number of players and then equally divided. First subjects are asked who they would like to have in their group based on photographs and/or information on past behaviour. From these photographs

appearance, and therefore race, plays a role in the decision. A final treatment randomly assigns either a low or high price of giving to the pot to each subject, so that contribution behaviour is not correlated with a subject's gender or race. They find that race only matters when information on past behaviour is absent. As soon as payoff relevant information is provided, discrimination disappears. This is consistent with statistical discrimination. This experiment provides a colder environment in which to make decisions, which is a significant advantage of this experiment design.

In the Netherlands, the relationship between an individual's personal features and their likelihood of discriminating against ethnic minority applicants was researched (Blommaert, Coenders, & van Tubergen, 2013). They attempt to predict the influence of people's interethnic contacts, education and religion on their behaviour towards minority job applicants. A combination of experimental and survey data is used to collect information on participants and measure the extent to which they discriminate. The subjects review resumes of fictitious applicants in a laboratory experiment and fill out a survey. As it turns out, students in higher education who are generally more tolerant, also discriminate against minority applications. They also find that men and students whose parents are church members discriminate more often. The quality of interethnic contacts is related positively to discrimination. An strength of this experiment is the measurement of different phases at which decisions take place. It seems the ethnicity of applicants has a significant effect in both phases – the assessment of suitability for the job and the decision whom to invite for an interview – but is most important for interview selection. A weakness of the experiment is that it does not provide information on real-life recruitment decisions.

An extremely interesting aspect of these laboratory experiments is the insight they offer into the origin of discrimination. Whereas field experiments merely show evidence of the presence of discrimination, and sometimes its magnitude, these laboratory experiments help reveal the characteristics might cause a person to discriminate and what type of discrimination it is. It is the highly controlled environment that allows researchers to distinguish between the effect of preferences for one's own group and the effect of information-based discrimination (Anderson, Fryer, & Holt, 2006) However, a weakness of laboratory experiments is that they do not offer an analysis of the real-world job market and the results are not always externally valid, in other words applicable in real-world situations.

An interesting study that takes a different approach but finds results in line with those discussed above is one concerning the economic payoff of "name Americanization" (Biavaschi, Giulietti, &

Siddique, 2013). Immigrants changing their names to popular, more American-sounding names is a phenomenon that has long since been observed in the United States. This study shows evidence of name-based and thus race-based discrimination in the labour market. It is a longitudinal study, following immigrants who had changed their name by 1930. They find a causal effect of occupational earnings increase after name Americanisation into the most popular names.

2.3 Discussion

Although some groundwork has been done in the papers investigating discrimination using other methods than field experiments, a major gap in economic literature is the lack of insight into the origin of discrimination[1]. The field experiments conducted in more than ten different countries all show evidence of ethnic discrimination in the hiring process. In every country, however, a different ethnic group falls victim to discrimination. Apart from the obvious fact that they are often the largest immigrant group within a country, very little work has been done on the effect of employer characteristics on their propensity to discriminate.

Psychologists have developed the notion of "social categorization." This notion explains that people classify others into groups based on comparable characteristics, that humans automatically think with the aid of categories (Anderson, Fryer, & Holt, 2006). Ethnic discrimination, as well as stereotypes and prejudice, may be a result of this categorization. Mullainathan (2002), in a preliminary draft at the time, sets up an economic model of categorization in which people use coarse categories. In many economic models on decision making and strategies, we look for perfect Bayesian equilibria. A key assumption is that people are constantly learning and updating their beliefs using probabilities according to Baye's rule (Gibbons, 1997). These updated beliefs are called posteriors. Categorical thinking according to Mullainathan, however, assumes a simplification of Bayesian thinking in which people only update categories when they receive enough data to suggest another category fits better. Rather than an infinite set of possible posteriors, people hold a finite set. Under different circumstances, people may over- or underreact to news. Although this model has been developed further in finance (Shleifer, Mullainathan, & Schwartzstein, 2006), it would be extremely interesting to see this model applied to the hiring process and how an employer predicts the future probability of a worker.

[1] For a review of the sociological literature on discrimination providing similar results, see (Pager & Sheperd, 2008)

Moreover, there is virtually no research done in economics that links this type of discrimination in the initial stages of the hiring process with discrimination by employees. Consider a work environment such as a small office, where employees are constantly in close proximity of each other. Would an employer hiring a new worker not consider the predispositions and prejudices of his employees? This is another aspect of the search for the reasons behind discrimination in which economists could learn from psychological experiments.

Another shortcoming of the research discussed above is the ability to apply the results to find a solution to discrimination. In the category of field experiments, only one paper actually included a policy recommendation. Oreopoulos (2011) suggested the masking of names on applications in the stages where employers select candidates for interviews. It is not difficult to implement, especially when candidates fill out an application online. Even when applications are sent in hard copy, employers could request name and contact details are given on the last page of the resume, which is then easy to remove. Oreopoulos does not consider, however, that many of these type of experiments use identical resumes, the only difference being the name. In reality, race or ethnicity or assumptions about race or ethnicity can most likely be deduced through other information such as place of birth or current address, writing style and language skills.

Section 3: Wage Differentials

3.1 The Oaxaca-Blinder Decomposition Technique

The solid foundation on which research on wage differentials have been built was developed in the early 1970s by two economists, Alan Blinder and Ronald Oaxaca. They developed an econometric technique for studying ethnic and gender wage differentials based on regression analysis, see (Blinder, 1973) and (Oaxaca, 1973). The Blinder-Oaxaca decomposition technique (or Oaxaca decomposition) decomposes the raw wage differential into a portion related to a difference in observable characteristics such as skills and a portion attributable to labour market discrimination. These two portions are called characteristics and coefficient effects. The basic decomposition works as follows[2]:

Male earnings function:

$$w_M = \alpha_M + \beta_M s_M + \varepsilon_M$$

Female earnings function:

$$w_F = \alpha_F + \beta_F s_F + \varepsilon_F$$

Where w_i is the wage, α_i is the intercept and β_i is the coefficient of years of schooling (s). ε_i is an error term. In an economic analysis, w_i is expressed as the natural logarithm of wages[3]. The raw wage differential is then:

$$\Delta\overline{w} = (\alpha_M - \alpha_F) + \beta_M \bar{s}_M - \beta_F \bar{s}_F$$

$$\Delta\overline{w} = (\alpha_M - \alpha_F) + (\beta_M - \beta_{F)}\bar{s}_F + \beta_M(\bar{s}_M - \bar{s}_F)$$

The last term in the equation above, $\beta_M(\bar{s}_M - \bar{s}_F)$, represents the difference in skills. The remaining terms in the equation represent the portion of the wage differential that is not explained by this skill difference. This can be attributed to discrimination. One must take care, however, to control for every single dimension in which the skills of males and females (minority group and majority group) differ. As is apparent from the equation above, any factors omitted in the earnings function will affect the portion of the wage differential attributed to discrimination, leading to overestimation of discrimination. It is, of course, near impossible to account for all differences in difficult-to-observe characteristics such as motivation. The measure of discrimination using the Oaxaca decomposition

[2] This example is of a gender wage differential decomposition, as Oaxaca (1973) presents it. This was later generalized by Oaxaca and others to be applicable to different ethnic groups as well.
[3] Sociologists use level wages.

will therefore not be precise. Moreover, the results are strongly affected by the choice of reference group. Many studies discussed later on in this chapter face these problems or attempt to solve them.

The Oaxaca decomposition was found to be a hugely flexible technique. In the years after its publication, the technique has been generalized by Neumark (1988), Cotton (1988), Juhn, Murphy, & Pierce (1991) and Oaxaca & Ransom (1994) with respect to employers' general discriminatory behaviour, the non-discriminatory wage structure in the whole labour market and single firms and black-white wage convergence . The model has also been extended. Machado and Mata (2005) and Melly (2005) formed decomposition methods for quantile regressions. Machado & Mata use quantile regressions to capture the impact of changes in covariates upon a conditional wage distribution. By marginalizing the estimated conditional distribution using different scenarios for the distribution of covariates or workers' attributes, changes in the wage distribution over time can be decomposed into the factors contributing to those changes. Fairlie (2006) created a non-linear composition technique, the main advantage of which is the possibility to directly use coefficient estimates from logit or probit models. Binary outcome variables such as employment or college attendance can now be used in decomposition estimates. Bauer and Sinning (2008) generalize the non-linear model developed by Fairlie to ordered logit and probit models and extend the Blinder-Oaxaca decomposition to truncated regression and tobit models, measured using maximum likelihood.

The majority of the studies that will be discussed below make use of a Mincer-type wage equation. The Mincer wage regression (Mincer, 1974) describes wage as a function of education and work experience and is typically expressed as follows:

$$\ln w = \ln w_0 + \alpha S + \beta_1 X + \beta_2 X^2$$

Where w is the wage, α is the return to S years of schooling and β_i is the return to X years of work experience. Note that the equation does not help find the optimal amount of schooling or experience (Borjas, 2012). When race is added, for example in the form of a dummy variable indicating the individual belongs to a majority or minority group, the equation can be used to investigate wage discrimination.

3.2 Studies following the Blinder-Oaxaca Decomposition[4]

A study conducted on native-immigrant male wage differentials in the Netherlands based its estimations on the Oaxaca decomposition and used a type 2 tobit model with two latent variables (Kee, 1995). Setting this study apart is their recognition of immigrants obtaining part of their human capital outside the Netherlands and the splitting of discrimination into a treatment effect measuring the advantage of natives and a treatment effect measuring the disadvantage of immigrants. They find that education is the largest factor accounting for wage-offer differentials. In particular, the difference in education in the home country and the Netherlands accounts for the differential. This is especially important for Turkish and Moroccan immigrants. This model is limited, however, due to the fact that it ignores the difference in quality of schooling.

In Germany, a study using a very similar method to Kee's analysing the wage differential between natives and foreign male workers of fourteen different nationalities was conducted (Velling, 1995). It is the first empirical study of ethnic discrimination against foreigners in the German labour market. Following the Blinder-Oaxaca decomposition, the estimated wage differential between natives and foreigners is 13.1 percent. Of this differential, 10.9 percent can be explained by human capital endowment effects. The remainder is attributed to discrimination. When looking at isolated nationalities, Velling finds discrimination is strongest against Eastern European and Middle Eastern men. There is occupational segregation. However, the qualitative difference in human capital endowments between natives and foreigners has not been accounted for, such as education and language proficiency. His findings have been confirmed by recent studies. Lehmer and Ludsteck (2011) find the wage differential is highest for immigrants from Poland and Brücker and Jahn (2011) conclude that natives and immigrants are not perfect substitutes. Bartolucci (2013) finds a wage differential attributable to discrimination between 7 and 17 percent. Constant and Massey (2003) do attempt to control for human capital differences and conclude that immigrants find it more difficult than natives to use their human capital to find a first job.

In Switzerland, which has the highest share of foreigners among OECD countries, there is also evidence of discrimination (Golder, 2000). For both male and female workers, the wage differential found is largely explained by a difference in education. The rate of return on education and experience seems to be lower for immigrants than for natives. Another study carried out in Switzerland also finds education to be a strong determinant of the wage differential observed between natives and various ethnic groups (De Coulon, 2001).

[4] There are many early studies not mentioned in detail, see (Abbot & Beach, 1987), (Butler, 1982), (Chiswick, 1980), (McManus, Gould, & Welch, 1983)

A study taking a more sociological perspective investigates the wage differential using a series of fixed-effect models (Tomaskovic-Devey, Thomas, & Johnson, 2005). The advantage of this approach is that the presence of interaction between ethnicity and earnings across time indicates labour market discrimination. The absence of such interaction indicates the wage differential originates from premarket differences. Moreover, they follow subjects over time and across careers. One of the findings is that the wage differential is greater at higher levels of education, a reason for which may be that blacks' human capital is not as highly regarded. They also find the wage gap increases over the lifetime of individuals, as high as fourteen percent around the age of forty.

Machado & Mata (2005) investigate the reasons for the increased wage inequality experienced in Portugal over the period 1986-1995. They base their estimates on the conditional median function, measuring the outcome variable given certain changes in the independent variable, wage. They find education to be a crucial factor and find two underlying reasons. First, the returns to education increased at the top of the wage distribution, but remained constant at the bottom. Second, there was an increase in the level of education in Portugal. Quantile regression is more robust to outliers than least squares regression and allows the interpretation of the impact of a covariate on the entire distribution of wages. Montgomery and Powell (2003) extended this model by solving the problem of different quantile curves crossing. De Matos (2012) finds that immigrants in Portugal tend to work in different industries or occupations than natives.

Black et al (2006) want to find the reason blacks, Hispanics and Asians have lower wages than whites in the United States. They begin by looking at premarket factors. One of these is education. Blacks and Hispanics, for instance, appear to have lower levels of completed education, which also tends to be of lower quality. For Asians and Hispanics, who tend to be immigrants, English language ability is an important factor. From the National Survey of College Graduates (NSCG) data they find that college-educated minority men earn less that white men. For Hispanics and Asians, this wage differential is completely due to measurement error and premarket explanatory factors, being age structure, formal education and language proficiency. For blacks, too, the wage gap can be explained once the researchers control for additional factors. Their approach follows the Blinder-Oaxaca decomposition, but use a non-parametric decomposition to avoid misspecification of relationships in the model[5] (Black, Haviland, Sanders, & Taylor, 2006).

The main argument against using a parametric approach is that a functional form for the conditional expectations function must be specified, leading to bias and misinterpretation of the wage

[5] See Barsky et al. (2002), Racine and Greene (2002) and Heckman, Lochner, and Todd (2003) for an evaluation of the use of parametric versus non-parametric models

differential if this conditional expectations function is not specified correctly (Barsky, Bound, Charles, & Lupton, 2002). A non-parametric technique allows variation in the structure of the model according to the data and does not rely on a given probability distribution, but rather varies the empirical distribution of explanatory variables by assigning weights to them.

3.2.1 Armed Forces Qualification Test as a Proxy for Human Capital

A lot of research on black-white wage differentials has been done in the United States using the Armed Forces Qualification Test (AFQT) as a proxy for human capital. This has brought about mixed results. Derek Neal and William Johnson (1996) write an important article using the AFQT as a measure of skill. They find that the wage differential is very small and not statistically significant after controlling for age and performance on the test[6]. They can explain a larger part of the present wage differential than earlier studies using the AFQT as a measure of skill[7]. They also show that the rate of return on the AFQT score is similar for blacks and whites and deduce the wage differential is largely due to premarket factors and not necessarily due to discrimination.

Others have expanded on this research and find the wage differential re-emerging. Rodgers and Spriggs (1996) find that the AFQT does not predict black and white wages equally using an F-test. They also find a difference in the prediction of wages for blacks and whites when the separate components, verbal and mathematical, of the test are used instead of the final score. The difference is sustained across the adding family background and school quality variables. They attempt to control for racial bias by weighting the final AFQT scores. Adding these variables, the wage gap widens substantially. Pedro Carneiro, James Heckman and Dimitry Masterov (2005) find a similar result.

Another study conducted in the United States follows the approach used by Neil and Johnson (1996) but adds a location variable to their model and concludes that this increases the wage differential (Black, Kolesnikova, Sanders, & Taylor, 2010). More specifically, they add a variable for where the individual works and lives. They argue the wage differential is overstated when ignoring location. This supports the view that premarket factors are not the sole source of the wage differential.

David Bjerk (2007) examines the nature of wage inequality across occupation sectors in an attempt to explain the wage differential Neal and Johnson (1996) could not. He finds the wage differential varies across occupations and is substantially larger in the blue-collar sector while the entire wage differential in the white-collar system is explained by the academic skill level of workers. In

[6] In an earlier study by O'Neill (1990), the wage differential also disappears after controlling for other factors (work experience and occupation).

[7] See Oaxaca & Ransom (1994), Reimers (1983), Corcoran & Duncan (1979)

accordance with earlier studies he finds that using the AFQT results explains a large part of the wage differential. Looking from a taste-based discrimination point of view, this can be explained by the fact that academic skills are more important in the white-collar sector so discrimination is less likely to persist in this sector. This also leads to a difference in the effort employers put into gathering information on a worker's ability, in line with statistical discrimination. It may, however, also be the result of omitted variables or measurement errors.

Altonji and Pierret (2001) test whether easily observable characteristics are the basis for statistical discrimination and whether employers learn. They use data on these easily observable characteristics: education and less easily observed characteristics: the AFQT test, father's education, wages and siblings' wages to set up a signalling model. They find that the more information an employer has about a worker, the less dependent earnings will become on easily observable characteristics. It also appears that race is correlated with productivity in the view of employers and they find evidence of statistical discrimination.

Similarly, Kevin Lang and Michael Manove (2011) use a model of statistical discrimination where a worker's ability is not observable to the employer. Only race and educational attainment are. The score on the AFQT is used as a proxy for ability. They allow the return to the AFQT score to vary between blacks and whites. Using the model, they predict that there is only a wage differential at intermediate levels of education, not at very low and very high levels. Controlling for both education and ability, the estimated wage differential increases. In fact, whites will earn an amount equal to the return to one year of education more than blacks. A critique on this paper is the lack of consideration of quality of schooling. They dismiss it as an important factor, although it most likely should not be. Pinkston (2006) also varies the estimated return to education between blacks and whites and reaches similar conclusions. This brings back labour-market factors as an important source of labour market discrimination.

The use of the AFQT as a proxy for human capital is controversial. On one hand, the test is taken before entering the labour market and thus unbiased (Neal & Johnson, 1996). It also reflects both innate skills and acquired skills (Lang & Manove, 2011). On the other hand, it is said to be a weak indicator of the individual's investment in human capital as it doesn't measure all aspects of schooling, only verbal and mathematical skills. Moreover, the test is said to suffer from racial bias (Rodgers & Spriggs, 1996). If the ability to perform well on tests is correlated with race, it is not a fit measure of skill level.

3.3 Discussion

A major problem with the analysis of wage differentials that occurs time and again in the research covered is the need for observable productive characteristics for each group examined. Any unexplained difference in wages that remain after controlling for these characteristics is attributed to labour market discrimination. Another problem is that measures of productivity or skill are not always exogenous to the model. As seen above, many researchers have controlled for factors such as schooling, address, place of birth or work experience. Furthermore, the model holds the assumption that, in the absence of discriminatory practices, the skill levels of the two groups would be identical. Many studies fail to consider the fact that minority and majority groups enter the labour market with a different set of skills. One has to be careful with the interpretation of the results of these studies, as it could either be the case that researchers control for too little variables or control for too many. Take for, example, a longitudinal study, spanning 50 years, analysing the wage differential between blacks and whites (Chandra, 2000). This concludes that the wage differential has most likely been understated in a lot of research due to the fact that unemployment is higher among low-skilled black men than among low-skilled white men. Moreover, low-skilled black men are more likely to be incarcerated.

Neal and Johnson (1996) attempt to avoid these problems by using a reduced-form wage equation, using only exogenous variables: ethnicity, gender, age and the AFQT test score. They claim education is endogenous and therefore do not include it. If, however, in anticipation of labour market discrimination, blacks choose more education, it is important to control for this variable to avoid understating the level of discrimination (Lang & Manove, 2011). When looking at the endogeneity issue it is also important to distinguish between human capital acquired before entering the labour market, such as education, and human capital required after entering the labour market, such as experience and on-the-job training, as seen in (Tomaskovic-Devey, Thomas, & Johnson, 2005).

A trend in the results across literature seems to be the effect of premarket factors, especially education, on wage differentials. What the studies seem to conclude collectively is the need for a reduction of the skill gap between blacks and whites. This is in line with the human capital model, a baseline model for research in this area. Human capital is an individual's unique set of abilities and acquired skills (Borjas, 2012). The theory is that human capital can be accumulated through education and work experience. More or a higher education should increase a worker's productivity, which will ultimately lead to higher wages. What all this research seems to agree on is the need to even out this access to human capital and the importance of reducing the difference in ability to acquire skills between minority and majority groups. There is, however, very little research focused on how to do so. Furthermore, if one looks at education as a mere signal of a worker's innate ability

and productivity, this view does not hold. In reality, after all, employers cannot always observe productivity directly.

A few studies deviate from the human capital model. Altonji and Pierret (2001) and Lang and Manove (2011) set up a game-theoretic signalling model. They argue that, as ability is only known to the worker, statistical discrimination leads to blacks signalling their ability to the employer through educational attainment. Employers directly observe race and education but they assume it is more difficult for an employer to observe the productivity of black workers than of white workers. For blacks, therefore, employers attach a greater importance to education. Lang and Manove find that blacks then choose to get more education than whites of similar ability. This is in contrast with the assumption that blacks often obtain less education. The model, however, cannot fully explain the data they use.

In comparison to the research done on discrimination in the hiring process, where the source of the difference between minority and majority groups is often almost entirely due to discrimination, the wage differential can largely be explained by a difference in employee characteristics.

Section 4: Concluding Remarks

Discrimination in the labour market has been a topic of discussion amongst researchers for over fifty years now. This paper has summarized the baseline theories on discrimination and collected as well as analysed influential research conducted on this topic across the world. Based on all the studies discussed, there is overwhelming empirical evidence that ethnic and racial discrimination exists in the labour market. These robust results holds across multiple countries and continents.

In section 2, discrimination in the initial stages of the hiring process was examined. Discrimination was measured in many studies as the result of sending a resume: receiving a callback, in other words an invitation for an interview, or not. All studies find a significant difference between the number of callbacks for a majority applicant and the number of callbacks for a minority applicant under various conditions. Moreover, a set of game-theoretical experiments offers some more insight as to who has the propensity to discriminate.

Section 3 discussed wage discrimination. Most of these studies follow and expand on the early method developed by Blinder and Oaxaca and make use of Mincer-type wage equations. Discrimination in this section is generally measured by the unexplained wage differential between the majority and minority group. These results are a little less concrete than in section 1. Although most studies find a wage differential attributable to discrimination, it varies greatly and in some cases, the unexplained wage differential disappears almost completely when controlling for certain factors. A trend in this research is the importance of education and the reduction of the skill gap between the majority and minority groups.

A large gap in the literature is the lack of explanation of the causes of discrimination. The economic literature seems focused on finding evidence of the presence of ethnic or racial discriminations rather than finding out where this comes from and how it can be solved. In this aspect, the game-theoretical experiments come closest. There is a lot of potential for future research using game theory to explain discrimination in the labour market.

Works Cited

Abbot, M., & Beach, C. (1987). Immigrant earnings differentials and cohort effects in Canada. *Discussion Paper no. 705, Queen's University, Kingston, Ont*.

Altonji, J. G., & Pierret, C. R. (2001). Employer Learning and Statistical Discrimination. *The Quarterly Journal of Economics, Vol. 116, No. 1*, 313-350.

Anderson, R., Fryer, R., & Holt, C. (2006). Discrimination: Eperimental Evidence from Psychology and Economics. In W. Rodgers, *Handbook on the Economics of Discrimination* (pp. 97-115). Northampton: Edward Elgar.

Arceo-Gomez, E., & Campos-Vazquez, R. (2014). Race and Marriage in the Labor Market: A Discrimination Correspondence Study in a Developing Country. *American Economic Review: Papers & Proceedings 104(5)*, 376-380.

Arrow, K. (1972). Models of job discrimination. 83-102.

Aydemir, A., & Skuterud, M. (2008). The immigrant wage differential within and across establishments. *Industrial and Labour Relations Review, Vol. 61, No. 3*, 334-352.

Barsky, R., Bound, J., Charles, K. K., & Lupton, J. P. (2002). Accounting for the black-white wage gap: a nonparametric approach. *Journoul of the Americal Statistical Association 97*, 663-673.

Bartolucci, C. (2013). Understanding the native-immigrant wage gap using matched employer-employee data. Evidence from Germany. *Industrial Labor Relations Review*.

Bauer, T., & Sinning, M. (2008). An extension of the Blinder–Oaxaca decomposition to nonlinear models.

BBC. (2015, June 27). *US Supreme Court rules gay marriage is legal nationwide*. Retrieved from BBC News: http://www.bbc.com/news/world-us-canada-33290341

Becker. (1957). The Economics of Discrimination. *Chicago: Univ, Chicago Press*.

Bendick, M., Jackson, C., & Reinoso, V. (1994). Measuring employment discrimination through controlled experiments. *The Review of Black Political Economy, Vol. 21, Issue 1*, 25-48.

Bertrand, M., & Mullainathan, S. (2004). Are Emily and Greg more employable than Lakisha and Jamal? A Field Experiment on Labour Market Discrimination. *The American Economic Review 94*, 991-1013.

Biavaschi, C., Giulietti, C., & Siddique, Z. (2013). The Economic Payoff of Name Americanization. *IZA DP No. 7725*.

Bjerk, D. (2007). The Differing Nature of Black- White Wage Inequality Across Occupational Sectors. *The Journal of Human Resources, Vol. 42, No. 2*, 398-434.

Black, D., Haviland, A., Sanders, S., & Taylor, L. J. (2006). Why Do Minority Men Earn Less? A Study of Wage Differentials Among the Highly Educated. *The Review of Economics and Statistics 88*, 300-313.

Black, D., Kolesnikova, N., Sanders, S., & Taylor, L. (2010). The Role of Location in Evaluating Racial Wage Disparity.

Blinder, A. (1973). Wage Discrimination: reduced form and structural estimates. *Journal of Human Resources, Vol. 8*, 436-455.

Blommaert, L., Coenders, M., & van Tubergen, F. (2013). Ethnic Discrimination in Recruitment and Decision Makers' Features: Evidence from Laboratory Experiment and Survey Data using a Student Sample.

Borjas, G. J. (2012). Labour Economics. Mcgraw-Hill Education.

Brait, E. (2015, July 11). *Sikh postman accuses Disney World of discrimination by segregating routes*. Retrieved from The Guardian: http://www.theguardian.com/world/2015/jul/11/disney-world-sikh-postman-discrimination

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

Brücker, H., & Jahn, E. (2011). Migration and wage-setting: reassessing the labor market effect of migration. *Scandinavian Journal of Economics, Volume 113, Issue 2*, 286-317.

Butler, R. (1982). Estimating Wage Discrimination in the Labor Market. *Journal of Human Resources 17*, 606-621.

Carlsson, M., & Rooth, D.-O. (2007). Evidence of Ethnic Discrimination in the Swedish Labour Market Using Experimental Data. *Labour Economics 14*, 716-729.

Carneiro, P., Heckman, J., & Masterov, D. (2005). Understanding the sources of ethnic and racial wage gaps and their implications for policy.

Castillo, M., & Petrie, R. (2010). Discrimination in the lab: Does information trump appearance? *Games and Economic Behaviour 68*, 50-59.

Chandra, A. (2000). Labor-Market Dropouts and the Racial Wage Gap: 1940-1990. *American Economic Review, Vol. 90, No. 2*, 33-38.

Chiswick, B. (1980). The Earnings of White and Coloured Male Immigrants in Britain. *Economica 47*, 81-87.

Constant, A., & Massey, D. (2003). Labor Market Segmentation and the Earnings of German Guestworkers. *IZA Discussion Paper No. 774*.

Corcoran, M., & Duncan, G. (1979). Work History, Labor Force Attachment, and Earnings Differences between the Races and Sexes. *Journal of Human Resources 14*, 3-20.

Cotton, J. (1988). On the decomposition of wage differentials. *Review of Economics and Statistics 70*, 236-243.

De Coulon, A. (2001). Wage Differentials between Ethnic Groups in Switzerland. *LABOUR, Volume 15, Issue 1*, 111-132.

de Matos, A. (2012). The Careers of Immigrants. *CEP Discussion Papers 1171. Centre for Economic Performance, LSE*.

Drydakis, N., & Vlassis, M. (2010). Ethnic Discrimination in the Greek Labour Market: Occupational Access, Insurance Coverage and Wage Offers. *The Manchester School Vol. 78 No. 3*, 201-218.

Eriksson, S., & Lagerström, J. (2007). Detecting discrimination in the hiring process:Evidence from an internet-based search channel. *Working Paper, IFAU - Institute for Labour Market Policy Evaluation, No. 2007: 19*.

Fairlie, R. (2006). An Extension of the Blinder-Oaxaca Decomposition Technique to Logit and Probit Models. *IZA Discussion Paper No. 1917*.

Fershtman, C., & Gneezy, U. (2001). Discrimination in a Segmented Society: An Experimental Approach. *The Quarterly Journal of Economics Vol. 116, No. 1*, 351-377.

Gibbons, R. (1997). An Introduction to Applicable Game Theory. *The Journal of Economic Perspectives, Vol. 11, No. 1*, 217-149.

Golder, S. (2000). Endowment or Discrimination? An Analysis of Immigrant-Native Earnings Differentials in Switzerland. *Kiel Working Paper, No. 967*.

Gutterridge, N. (2015, June 16). *Boris Johnson 'breached gender discrimination laws' with defence of Sir Tim Hunt claims MP*. Retrieved from Express, Home of the Daily and Sunday Express: http://www.express.co.uk/news/uk/584835/Boris-Johnson-breach-gender-discrimination-laws-defence-Nobel-Prize-Sir-Tim-Hunt

Heckman, J. J., Lochner, L., & Todd, P. (2003). Fifty Years of Mincer Earnings Regressions. *NBER Working Paper no. 9732*.

Heckman, J., & Siegelman, P. (1993). The Urban Institute audit studies: their methods and findings. In M. Fix, & R. Struyk, *Clear and Convincing Evidence: Measurement of Discrimination in America.* Urban Institute.

Hubbuck, J., & Carter, S. (1980). *Half a Chance? A Report on Job Discriminaton against Young Blacks in Nottingham.* London: Comission for Racial Equality.

Jowell, R., & Prescott-Clarke, P. (1970). Racial discrimination and white-collar workers in Britain. *Race, Vol. 11*, 397-417.

Juhn, C., Murphy, K., & Pierce, B. (1991). Accounting for the slowdown in black-white wage convergance. In M. Kosters, *Workers and Their Wages: Changing Patterns in the United States.* Washington: American Enterprise Institute.

Kaas, L., & Manger, C. (2012). Ethnic Discrimination in Germany's Labour Market: A Field Experiment. *German Economic Review 13*, 1-20.

Kee, P. (1995). Native-Immigrant Wage Differentials in the Netherlands: Discrimination? *Oxford Economic Papers, Vol 47, No. 2*, 302-317.

Lang, K., & Manove, M. (2011). Education and Labor Market Discrimination. *American Economic Review 101*, 1467-1496.

Lehmer, F., & Ludsteck, J. (2011). The returns to job mobility and inter-regional migration: evidence from Germany. *International Migration Review, Volume 45, Issue 4*, 872-906.

Machado, J., & Mata, J. (2005). Counterfactual Decomposition of Changes in Wage Distributions using Quantile Regression. *Journal of Applied Econometrics 20*, 445-465.

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

McManus, W., Gould, W., & Welch, F. (1983). Earnings of Hispanic Men: The Role of English Language Proficiency. *Journal of Labour Economics 1*, 101-130.

Melly, B. (2005). Decomposition of differences in distribution using quantile regression. *Labour Economics 12*, 577-590.

Mincer, J. (1974). *Schooling, Experience and Earnings.* National Bureau of Economic Research, Inc. .

Montgomery, M., & Powell, I. (2003). Does an Advanced Degree Reduce the Gender Wage Gap? Evidence from MBAs. *A Journal of Economy and Society, Vol. 42, Issue 3*, 396-418.

Mullainathan, S. (2002). *Thinking Through Categories.* MIT and NBER.

Neal, D. A., & Johnson, W. R. (1996). The Role of Premarket Factors in Black-White Wage Differences. *The Journal of Political Economy, Volume 104, Issue 5*, 869-895.

Neumark, D. (1988). Employers' discriminatory behaviour and the estimation of wage discrimination. *J. Hum. Res 23*, 279-295.

Oaxaca. (1973). Male-female wage differentials in urban labour markets. *International Economic Review, Vol. 14*, 693-709.

Oaxaca, R., & Ransom, M. (1994). On discrimination and the decomposition of wage differentials. *Journal of Econometrics 61*, 5-21.

O'Neill, J. (1990). The Role of Human Capital in Earnings Differences between Black and White Men. *Journal of Economic Perspectives 4*, 25-45.

Oreopoulos, P. (2011). Why do Skilled Immigrants Struggle in the Labor Market? A Field Experiment with Thirteen Thousand Resumes. *American Economic Journal: Economic Policy 3*, 148-171.

Pager, D. (2003). The Mark of a Criminal Record. *American Journal of Sociology, Vol. 108, No. 5*, 937-975.

Pager, D., & Sheperd, H. (2008). The Sociology of Discrimination: Racial Discrimination in Employment, Housing, Credit, and Consumer Markets. *Annual Review of Sociology* , 181-209.

Pager, D., Western, B., & Bonikowski, B. (2009). Discrimination in a Low-Wage Labor Market: A Field Experiment. *American Sociological Review vol. 74 no. 5*, 777-799.

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

Pinkston, J. (2006). A Test of Screening Discrimination with Employer Learning. *Industrial Relations and Labour Review 59*, 267-284.

Racine, J. S., & Green, C. A. (2002). Nonparametric Estimation of Union and Gender Wage Gaps. *Unpublished paper, Syracuse University*.

Reimers, C. (1983). Labor Market Discrimination against Hispanic and Black Men. *Review of Economics and Statistics 65*, 570-579.

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

Rodgers, W., & Spriggs, W. (1996). What does the AFTQ really measure: race, wages, schooling and the AFQT score. *Review of Black Political Economy*, 13-46.

Shleifer, A., Mullainathan, S., & Schwartzstein, J. (2006). Coarse Thinking and Persuasion. *National Bureau of Economic Research Working Paper No. 12720*.

Tomaskovic-Devey, D., Thomas, M., & Johnson, K. (2005). Race and the Accumulation of Human Capital across the Career: A Theoretical Model and Fixed-Effects Application. *American Journal of Sociology, Vol. 111, No. 1*, 58-89.

Vaughan, G. M., Tajfel, H., & Williams, J. (1981). Bias in Reward Allocation in an Intergroup and an Interpersonal Context. *Social Psychology Quarterly, Vol. 44, No.1*, 37-42.

Velling, J. (1995). Wage discrimination and occupational segregation of foreign male workers in Germany. *ZEW Discussion Papers, No. 95-04*.

Ward, R. (1969). A Note on the Testing of Discrimination. *Race, vol. 11*, 218-233.

Wood, M., Hales, J., Purdon, S., Sejersen, T., & Hayllar, O. (2009). A Test for Racial Discrimination in Recruitment Practice in British Cities. *Deparment for Work and Pensions Research Report No. 607*.