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THE ROLE OF BEAUTY IN THE LABOR MARKET

PHILIPP KRAFT

DISSERTATION

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CONTENTS

PAPER 1

(NOT) JUST ANOTHER PRETTY FACE

EXPERIMENTAL EVIDENCE FOR DISCRIMINATION IN RECRUITMENT

ABSTRACT

The present study breaks new ground in labor economic research by providing direct evidence of potential discrimination among attractive and unattractive job candidates. It utilizes a field experiment, the so-called 'CV testing approach' (Jowell and Prescott-Clarke, 1970) to determine discrimination in recruitment based on physical attractiveness. Two individuals who are equivalent on all required and desired job characteristics except their physical attractiveness, apply for the same vacancy. Responses are carefully documented and discrimination is measured by which one job applicant is invited for an interview relative to the other. Application photos are used to examine the level of discrimination regarding an applicant´s physical attractiveness. The experiment is conducted among a set of 990 German firms. Results show that attractive candidates are on average 14% more likely to get an invitation for an interview.

1. Statement of the Problem

Equal employment opportunity laws require recruitment and other personnel practices of job applicants or employees to be undertaken without regard to sex, color, religion, race, age, disability and nationality (Basic Law for the Federal Republic of Germany[1]). On the assumption that these characteristics are immaterial to productivity, one could argue that the same should also be true for physical attractiveness. In other words, two equally qualified job candidates should have equal probabilities of being hired. Similarly, if two candidates with equivalent credentials apply for the same job, ideally they should receive equivalent responses to their applications for employment. In reality, however, this is not always the case. For instance, companies may give preference to white, or male, applicants over equally qualified, but minority applicants (e.g. Newman, 1978).

Discrimination in the labor market has generated a vast amount of research, much of it empirical (e.g. Firth, 1981; Bertrand and Mullainathan, 2004; Riach and Rich, 1991, 2006, 2007). One method of analyzing the nature and extent of discrimination, field experiments, has been successfully used to evaluate the presence of discrimination in recruitment based on the most common points of interest: age (Riach and Rich, 2007), gender (Riach and Rich, 1987, 2006), nationality (Firth, 1981; Riach and Rich, 1991) and disability (Riach and Rich, 2002). One example of a field experiment is the so-called 'CV testing approach', which was designed by Jowell and Prescott-Clarke (1970) to measure discrimination in the recruitment process. This procedure suggests sending matched written applications to the same vacancies and to confine the measurement to the first stage

[1] Taken from: http://www.gesetze-im-internet.de/bundesrecht/gg/gesamt.pdf

of the recruitment process, namely testing whether the applicants would be invited for an interview. The approach of using responses to written job applications to test for differences between the response rates for different groups has since caught on. Field experiments have shown extensive evidence of discrimination in recruitment against minority groups, for instance against African-Americans and Hispanics in the US (Bassanini and Saint-Martin, 2008; Cross et al., 1990); Indians, Pakistanis, West Indians and Africans in Britain (Bassanini and Saint-Martin, 2008); Turks in Germany (Goldberg et al., 1996) and non-Whites in White societies (Riach and Rich, 2002). Although the consensus seems to be that discrimination in recruitment is a well-established fact, it is still unclear what role physical attractiveness plays in the hiring process and whether there is discrimination against unattractive job candidates. The question which forms the basis for this research, therefore, is whether there are differences in the treatment of attractive and unattractive job candidates in the recruitment process. If, educational attainment and prior job experience being equivalent, an attractive candidate receives more positive responses from potential employers than an unattractive one, this provides direct evidence for physical attractiveness being an important factor in the recruitment process.

The rest of the paper is organized as follows. Section 2 discusses the related literature. Section 3 provides information about the data and describes the field experiment. Section 4 presents results, and Section 5 concludes.

2. Literature Review

2.1 The Impact of Beauty on the Labor Market

Recently many researchers have begun to analyze the impact of individual attributes, such as physical attractiveness, on the labor market. In particular, physical attractiveness has been found to have a positive effect on wages, the so-called 'beauty premium' (Hamermesh and Biddle, 1994). The finding that physical attractiveness has a positive effect on an individual's labor market outcome has been shown to exist across all types of industries. Subsequent empirical investigation (e.g. Averett and Korenman, 1996; Hamermesh and Biddle, 1994; Mulford et al., 1998) has repeatedly confirmed that beauty indeed does have a positive impact on wages. Several studies (e.g. Hamermesh and Biddle, 1994; Harper, 2000) postulate that people who are assessed as attractive earn more than unattractive people. Hamermesh and Biddle (1994) indicate that for United States and Canadian employees the expected hourly wage differences between men assessed to be unattractive and those judged to be attractive is 14% of the expected wage, with the 'beauty premium' for women being around 9%. The authors also identified a wage penalty for plainness, approximately 11% for women and 15% for men, slightly higher than the 'beauty premium'.

Another study also examined the influence of physical attractiveness in the labor market using longitudinal cohort data covering 11407 individuals born in Britain in 1958 (Harper, 2000). Results show that physical attractiveness has a substantial effect on earnings and employment patterns for both men and women. Irrespective of gender, those who are assessed as unattractive experience a significant earnings penalty. Most of the wage differentials based on an employee's physical attractiveness arises from employer discrimination.

There are also laboratory experiments which are intended to investigate the role of beauty in the labor market. Mobius and Rosenblatt (2006) designed an experimental labor market where 'employers' pay wages to 'workers' who perform a maze-solving task. Attractive 'workers' enjoy a sizeable 'beauty premium' without being better in solving mazes than unattractive 'workers'.

Besides laboratory experiments, field experiments have also been undertaken, the most well-known of these being that of Bertrand and Mullainathan (2004). The authors conducted the most ambitious correspondence test in the US to date, sending fictitious resumes responding to over 1300 employment advertisements in sales, administrative support, and clerical and customer services in Boston and Chicago. To test for racial discrimination, CVs were randomly assigned African-American or Caucasian-sounding names, and four CVs were sent out to each advertisement (two high-quality, two low-quality). They found a large racial difference in callback rates. White applicants were 1.5 times (50%) more likely to receive callbacks than African Americans. The methodological approach in the current study is similar to the approach of Bertrand and Mullainathan (2004) in that it also adopts the 'CV testing approach', but focuses on discrimination in recruitment based on an applicant's physical attractiveness instead.

2.2 The Impact of Beauty on Other Economic Settings

It is often assumed that physically attractive individuals are perceived and treated more positively in social interactions (Dion et al., 1972). It is a well-established fact from beauty research in psychology that individuals ascribe a number of positive traits to physically attractive people (e.g. Feingold, 1992). This phenomenon is termed the 'physical attractiveness stereotype' or the 'halo effect'; attractive individuals are expected to be more sociable and intelligent than less attractive individuals (e.g. Feingold, 1992; Langlois et al., 2000).[2]

By using experimental economic games, such as the ultimatum game or the trust game, researchers have found that physical attractiveness elicits altruistic, trusting and cooperative behavior among participants (e.g. Andreoni and Petrie, 2008; Solnick and Schweitzer, 1999; Wilson and Eckel, 2006). In this regard, Solnick and Schweitzer (1999) show that in an ultimatum game, offers of attractive and unattractive players do not differ, yet attractive responders receive significantly higher offers than unattractive ones. In trust games, Wilson and Eckel (2006) find that attractive trustees are viewed as more trustworthy but that attractive trustors are also expected to trust more. If the trustors do not live up to the expectations of the trustees, the trustees return less in the second stage of the game. In the public goods game, Andreoni and Petrie (2008) find that physically attractive players earn more relative to unattractive players. This comes not from the fact that attractive players contribute less to the public good, but from the fact that their presence increases other players' contributions. Similar to Wilson and Eckel (2006), Andreoni and Petrie (2008) also conclude that individuals seem to expect physically attractive players to be more cooperative. When this expectation is not met,

[2] Literature on the link between beauty and intelligence is extensively reviewed by Zebrowitz et al., 2002.

contributions decrease significantly in successive rounds of the game relative to groups without attractive members. Whereas in Andreoni and Petrie (2008) the attractiveness level of the participants is known, Eckel and Petrie (2011) examine if and how much individuals are willing to pay to see a photograph of those with whom they transact. They find that both trustors and trustees are prepared to pay for information on how attractive their transaction partner is. The players are willing to pay for this information on the assumption that physical attractiveness matters. The authors interpret this finding to mean that players draw inferences about the behavior and abilities of the photographed individual. This information may then serve as a basis for discrimination.

In a similar vein, in the work of Berggren et al. (2010), who conducted a field experiment of political elections in Finland, voters use the candidates' physical attractiveness to make positive inferences about their competence to serve in the parliament. They show that an increase in physical attractiveness by one standard deviation is associated with an increase of 17 – 20% in the number of votes for the average non-incumbent candidate. However, no significant effect of physical attractiveness could be found for incumbent candidates. These divergent findings might be explained by the absence of reliable information about the non-incumbent candidates. The absence of reliable information means that inferences concerning the candidate's capacity to hold office may be drawn from signals the voters can observe, including the candidate's physical appearance. Voters may vote based on how honest or trustworthy a candidate appears to be, without knowledge of the candidate's voting record. In my research this idea is applied to job applicants, who employers may deem suitable for a position by taking the applicant's level of physical attractiveness as a signal for their level of intelligence. The signaling effect of physical attractiveness is the topic of Paper 2.

3. Field Experiment

The field experiment generates a snapshot of discrimination in recruitment regarding an applicant's physical attractiveness in one particular segment of the German labor market, the market for internships. 1980 matched applications were sent out to companies which offer internships to students of economics and management science. The study focuses on the market for internships because internships provide opportunities to gain valuable job experience and such internships, especially in Germany, serve as an important prerequisite for entering the job market. Corroborating evidence comes from recent research which shows that internships continue to be an integral component of the job market. The National Association of Colleges and Employers' (NACE's) 2011 Internship & Co-op Survey reveals a positive correlation between internships and full-time employment after graduation. Employers fill approximately 40% of their hires from their internship programs (e.g. Callanan and Benzing, 2004; Zhao and Liden, 2011). Although the internships are not well paid, a student who has successfully completed an internship acquires valuable job experience and thereby significantly improves his or her employment opportunities after graduation. In the German labor market, at least one internship is commonly expected and often essential for getting a job.

3.1 CV Testing Approach

The design of the field experiment is based on international best practice, the so-called 'CV testing approach' or 'correspondence testing' developed by Jowell and Prescott-Clarke (1970), adapted for the purposes of the current study. Correspondence testing involves responding to real job vacancies with written applications and CVs. In

general, this involves sending out equivalent CVs that vary only by the variable of interest, e.g. ethnicity, age or gender of a job candidate. The advantage of the correspondence test is that it is possible to control the content of the application and thereby avoid the weaknesses of alternative approaches, such as face-to-face or telephone interviews. There are other approaches available, for instance, a survey of the actual employment situation; however, this approach would contribute little in the way of providing direct evidence, because initial responses of employers to varying characteristics of fictitious applicants cannot be recorded and therefore discrimination cannot be measured. Another approach of sending 'actor applicants' to the potential employer is very costly and "the inherent drawbacks of the technique are simply not capable of validation" (Wood et al., 2009, p. 13). These approaches have been heavily criticized due to the role of unobserved variables (Heckman and Siegelman, 1993). Tests involving actors are particularly difficult to implement successfully due to the requirement to match candidates across all characteristics relevant to an employer, except for the potential basis of discrimination. Another important consideration is that correspondence tests are, in general, less expensive than in-person experiments, so that a much greater number of observations can be collected. It is of utmost importance that the number of observations is large enough to ensure that documented discrimination is not due to chance.

While the strengths of the correspondence test are considerable, there are also some limitations. First, the outcome measure is crude, because one cares about whether an applicant gets the job and about the wage offered conditional on getting the job. The described procedure, however, simply measures the callback rate for interviews. This means that one would expect that reduced interview rates would translate into reduced job offers. However, it may be problematic to extrapolate the results into gaps in hiring

rates or earnings because we cannot assume that those candidates who made it to the second round (were shortlisted) were actually hired in the end. Second, there is only a limited number of jobs available for testing, namely those requiring written applications. This requirement rules out some low-skilled jobs in Germany which require an in-person application. The most salient weakness, however, is that formal channels of recruitment, such as newspaper or internet advertisements, represent only one channel for job search. As is well-known from the existing literature (e.g. Holzer, 1987), social networks are a common means through which people find jobs and one that clearly cannot be studied here. It is unclear how important social networks are in the market for internships, but it is known that social networks play a very significant role in the German labor market generally (Wegener, 1991).

3.2 Application

Two fictitious CVs[3] as well as cover letters were constructed which are intended to be *equivalent* in all personal and employment respects, but not *identical*, so as to avoid detection. These two CVs are equivalent except for the potential basis of discrimination, namely the physical attractiveness of the candidate. For this purpose, photos were attached to the applications. The inclusion of photos on applications is the usual practice in Germany, not only for this type of position (internships). 25 photographs of male individuals and 25 photographs of female individuals between the ages of 19 and 24 were rated by 35 randomly chosen individuals on a 5-point scale, which ranges from plain (1 point) to highly attractive (5 points).[4] The 3 photos ranked

[3] Detailed CVs are available from the author upon request.

[4] There are 35 evaluators in total. 12 women and 23 men rated each photo in terms of physical attractiveness. 65% of the evaluators are men, as in Germany most Human Resource managers are male. The evaluators were all between 30 and 45 years old.

most and 3 photos ranked least attractive[5] from each gender were selected to conduct the experiment and to examine the level of discrimination.[6] The first group is referred to as 'attractive' and the second group as 'unattractive'. The CVs were developed in consultation with Human Resource managers[7] who judged them for equivalence and made any appropriate modifications. In all treatment conditions, the job applicants were portrayed similarly. Each applicant was presented as being a second-year student of age 22 or 23. To receive a reasonable callback rate and in line with the demands of the German labor market, each application contained a cover letter, a CV, as well as a university transcript. Omitting one of the requested documents would reduce the candidate's chance for a callback.

The present field experiment focuses on a particular segment of the German labor market, the market for student internships in business and economics, which has the advantage that the application process can be automated by sending standard form letters and the potential bias caused by individually written and adjusted applications can be substantially reduced. Matched applications were sent to vacancies posted on large German internet job websites, including carrer24.de, jobscout24.de and monster.de.

Between August 2010 and April 2011, 1980 matched applications were sent out by email in response to 990 job advertisements. The 12 photos (6 male, 6 female) were matched to the two CVs. The 6 male and 6 female photos were subdivided into two groups: 3 attractive photos and 3 unattractive photos. For each gender, one out of the 3 attractive photos was randomly chosen and randomly assigned to one application.

[5] The photographs used in the present field experiment were rated almost unanimously as the most and least attractive: 93% of evaluators agreed on the most and least attractive female applicant; 87% of evaluators agreed on the most and least attractive male applicant.

[6] The photos can be found in Appendix E.

[7] Gratefully acknowledged is the advice and assistance received from Mr. Herbert Thiel and Dr. Frank Schwartz.

Similarly, one randomly chosen unattractive photo for each gender was randomly assigned to the other application.

To allow employers to contact the job applicants, individual e-mail addresses for each applicant were created and cell phones with applicant-specific numbers were prepared. Incoming calls, however, were not answered directly but redirected to voice mail where the caller is politely asked to leave a message. Further, the applicants´ street addresses indeed exist, so that the companies theoretically could have contacted the applicants via cell phone, e-mail and regular mail.[8]

Callbacks from potential employers were carefully recorded, as either negative (e.g. rejection of the application) or positive (e.g. invitation to an interview or request for further information) and discrimination was then measured by whether a given application elicited a callback. Apart from positive and negative responses, other information about the company and the vacancy was recorded, such as the name, size, location and industry classification of each company, the occupations applied for, and the length of waiting time for responses. A callback is defined as any action of a company that signals interest or disinterest in the respective applicant.

[8] The addresses have been anonymized.

4. Results

The main results of the test for discrimination based on an applicant´s physical attractiveness using the full dataset are summarized in Table 1. The results are expressed as the success rates for the two different applicants based on all sets of applications.

Table 1. Success Rates

	Applications sent		Success rate				
	attractive	unattractive	attractive	unattractive	Net discrimination	Number of applications per success: attractive	Number of applications per success: unattractive
full sample	990	990	72.32%	62.02%	10.3% (0.0001)	1.38	1.61
males	480	480	66.66%	55.41%	11.25% (0.0001)	1.50	1.80
females	510	510	77.65%	68.04%	9.61% (0.000)	1.29	1.47

Notes: (i) Success rate is defined as an invitation to an interview.
(ii) p-value of the t-test is in parenthesis.

Applications sent by an attractive candidate have a 72.32% chance of receiving a callback. Equivalent applications from a physically unattractive candidate have a 62.02% chance of being called back. This represents a net difference in callback rates of 10.3 percentage points (t-test p-value of 0.0001). Put differently, these results imply that a physically attractive applicant should expect on average 10 callbacks for every 14 vacancies the applicant applies to; on the other hand, a physically unattractive applicant would need to apply to 16 different vacancies to achieve the same result. That is, 14% more applications from unattractive candidates need to be sent for the same level of success.

The full sample was broken down into male and female applicants. Initial results of the field experiment to test for discrimination based on a male and female

applicant´s physical attractiveness are presented in Table 1 (rows “males” and “females”).

Of the 480 applications sent by the attractive male candidate, 66.66% received a callback, compared to 55.41% of the applications sent by the unattractive candidate. This makes a net difference of 11.25 percentage points (t-test p-value of 0.0001). Put another way, 18 applications from a physically unattractive applicant had to be sent for 10 positive responses compared to 15 applications from an attractive applicant. That is, 20% more applications from unattractive candidates need to be sent for the same level of success. 77.65% of the 510 applications sent by the attractive female candidate received a callback, compared to 68.04% for the unattractive candidate, for a difference of 9.61 percentage points (t-test p-value of 0.000). Based on the callback rate for the female applicants, a physically attractive applicant would need to send 13 applications for 10 positive responses, while 15 applications are needed by the unattractive applicant for the same number of positive responses. Thus unattractive applicants need to submit 15% more applications than do attractive applicants.

There is a clear difference between the male and female sample in that the female sample shows a higher callback rate for both attractive and unattractive applicants. The higher callback rate is surprising, since the same CVs and cover letters were used for both the male and female samples. Also, the general assumption is that there is entrenched discrimination against females in the German labor market (e.g. Strengmann-Kuhn and Seel, 2004; Temple, 2001). The results here, though, cast some doubt on that claim. The higher callback rate may indicate a move by firms towards applying affirmative action policies which favor women over men. This possibility of gender-based 'reverse discrimination' in favor of women, however, does not mean there is no discrimination against unattractive female applicants. That is, although more women per se may receive callbacks than men, it is also the attractive ones who receive most of them.

Discrimination can disclose itself in several ways, not only in different response rates. Another type of discrimination might be the time period the applicants have to wait to get a response from the firms. Most firms reacted within days of the application being sent (see Table 2).

Table 2. Time Lag of Reaction in Working Days

	callback			rejection		
	attractive	unattractive	p-value of t-test	attractive	unattractive	p-value of t-test
full sample	4.8	7.1	0.0001	11.6	6.6	0.0002
males	5.8	8.4	0.0001	12.8	7.2	0.0001
females	3.9	5.9	0.0000	10.5	6.0	0.0001

As can be seen from Table 2, an unattractive applicant has to wait longer for a callback – an average of 7.1 working days, whereas an attractive applicant gets a callback within 4.8 workdays. For rejection, the waiting time is reversed and the lag time is even longer. While an unattractive applicant receives a rejection after 6.6 working days, a rejection for an attractive applicant needs 11.6 working days. That means that a firm needs 5.0 working days more to reject an application from an attractive applicant. Of further note is that the difference between callback and rejection times for the attractive applicant is nearly 14 times that of the unattractive applicant. In part this may be explained by the notification the attractive applicant received from some firms that his application had been shortlisted and was still being considered. This time lag seems to suggest that firms spend more time considering an application received from an attractive candidate.[9] Even though the CVs and accompanying materials from both applicants are equivalent, firms would seem to select round-two applicants based on non-job related factors, such as physical attractiveness, which may signal discrimination.

The presence of discrimination in recruitment based on the applicant's physical attractiveness, however, raises the question whether the results might be driven by a subset of occupations referred to as 'beauty-hungry'. Beauty-hungry occupations are those such as marketing and consulting, where physical attractiveness might enhance productivity due to the high levels of customer and coworker interaction. In the absence of a widely accepted objective measure for determining beauty-hungry occupations, I use a survey of employers' views of the importance of an applicant's appearance in filling job vacancies (Holzer, 1993). A breakdown of the number of beauty-hungry

[9] Running a duration model with 'time of response' as the dependent variable revealed no significant patterns. The coefficient on beauty is small but statistically significant (OLS coefficient 0.02*** (0.0044)).

occupations applied for by males and females may be found in Appendix F. With the objective to test whether the 'beauty premium' is of more importance in some occupations than in others, the following specification is used:

$$CallbackDummy_i = \alpha + \beta_1 (AttractiveDummy_i) + \beta_2 (Beauty\text{-}HungryOccupationDummy_i) + \beta_3 (AttractiveDummy_i * Beauty\text{-}HungryOccupationDummy_i) + \varepsilon_t \quad (1)$$

where $CallbackDummy_i$ equals 1 if the applicant receives a positive response and 0 otherwise, $AttractiveDummy_i$ equals 1 if the job candidate is attractive and 0 otherwise. $Beauty\text{-}HungryOccupationDummy_i$ equals 1 if the occupation has been identified as one where physical attractiveness might be rewarded. β_1 may be interpreted as the return to physical attractiveness regardless of occupation and β_3 the differential return to attractiveness which is occupation-specific. This regression yields insight into the significance of physical attractiveness in certain occupations. The results are as shown in Table 3.[10,11]

[10] Regressions were also run using a probit analysis. Results are qualitatively unchanged (pseudo R^2 is in the range of 0.007 to 0.009). In addition, a regression including monthly dummies to control for potential seasonal effects has been run. The inclusion of monthly time dummies also revealed no changes.

[11] I also run the quantile regression; this regression is robust to outliers. The results show no qualitative differences.

Table 3. Linear Probability Regression with Callback Dummy

Callback	Full (1)	Full (2)	Male (3)	Male (4)	Female (5)	Female (6)
Constant	0.6202***	0.62***	0.5541***	0.55***	0.6804***	0.68***
	(0.01)	(0.02)	(0.02)	(0.09)	(0.02)	(0.04)
Attractive	0.103***	0.103**	0.1125***	0.1125*	0.0961***	0.0961*
	(0.02)	(0.049)	(0.03)	(0.094)	(0.03)	(0.087)
Beauty-Hungry Occ.		0.001		0.02		-0.002
		(0.05)		(0.07)		(0.06)
Interaction Term		-0.0003		-0.0009		0.0009
		(0.06)		(0.09)		(0.08)
Observations	1980	1980	960	960	1020	1020
R^2	0.012	0.0124	0.0133	0.0139	0.0117	0.0121

Notes: Each column represents a linear probability regression with the callback dummy as dependent variable. Robust standard errors are in parentheses. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 3 reproduces the results of Table 1 (full sample: Column (1), males: Column (3) and females: Column (5)). This is included for the purposes of comparison. Column (2) displays whether there are premia in callback rates in beauty-hungry occupations. The results seem to suggest that the attribute of physical attractiveness is not more valued in occupations with a lot of customer and coworker interaction. There is no occupational discrimination at all in the full sample, nor is there occupational discrimination in the male and female subsamples. Rewards to physical attractiveness seem to be occupation independent. Results suggest that physical attractiveness is therefore not a bona fide factor for beauty-hungry occupations. The advantages of being physically attractive appear to stem from statistical or taste-based discrimination. The attribute of physical attractiveness is in general an advantage to getting an interview.

5. Conclusion

This paper extends existing studies on discrimination in recruitment. In particular, this research breaks new ground in labor economics by examining the role of physical attractiveness in the labor market. The innovation of this research lies in using a field experiment, the 'CV testing approach' (Jowell and Prescott-Clarke, 1970) to measure discrimination based on the physical attractiveness of applicants on the German internship market. The application of CV testing to the study of physical attractiveness is relatively new (Ruffle and Shtudiner, 2010), and has not yet been applied to any segment of the German labor market. Given the value of internships for later job-seeking, the internship market is highly competitive and serves as an illustrative example for the labor market more generally.

The field experiment reported in this study documents the existence of discrimination in the recruitment process regarding an applicant's physical attractiveness. The experiment shows that an application from a candidate rated to be among the most attractive ones is on average 14% more likely to receive a callback. If recruitment discrimination is borne out with further evidence beyond this experiment, it may help to explain why some employees deemed unattractive at the recruitment stage hold positions for which they are over-qualified. If physically attractive applicants are preferred over unattractive applicants with equivalent CVs, then the latter may need to possess even more qualifications or experience, relative to an attractive applicant, to actually get the job. Note that the present field experiment tested the very first stage of the hiring process, namely the invitation to an interview. Once the entire process of hiring has been completed with matched applicants, including attendance at interview, the likelihood that discrimination

occurred could be even higher (Bovenkerk, 1992). As with all experiments of this nature, only a limited number of occupations were tested: student internships. It is possible, however, that different discrimination rates, or no discrimination, would be found for different occupations. More research is necessary to answer these questions.

Results of this empirical analysis suggest that further policy changes need to be made in order to avoid job candidate selection based on non-job related factors. In terms of policy, Germany has relatively stringent legislation prohibiting discrimination in recruitment on the basis of non-job related factors, such as gender, race and nationality. Yet results from this field experiment suggest that discrimination in recruitment against physically unattractive candidates may nevertheless be present in the German labor market. The findings underline the need to provide resources to promote equality in the recruitment process. There are a number of possible measures that may help to reduce discrimination and promote equality in recruitment practices. First could be the dissemination of information to both the employer and applicant about what the anti-discrimination legislation permits and prohibits. Second, it could include developing guidelines for all employers to ensure their recruitment practices are not likely to be discriminatory. A third possibility is the introduction of random audits of recruitment practices, analogous to financial audits. Such random audits would reinforce the pressure for good and fair decisions in the recruitment process. A final option could be to ban photographs from job applications. In this case, however, the potential of discrimination would not be reduced but would only be shifted to the interview stage of the recruitment process.

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7. Appendix

A. Sample application: Attractive male applicant

Haydnstraße 10
69207 Sandhausen
Tel.: 0177 / 5538710
E-Mail: LukasBauer1987@gmail.com
XX Oktober 2010

Sehr geehrter Herr XXX,

auf der Suche nach einem lehrreichen und anspruchsvollen Arbeitsumfeld bin ich auf ihr Unternehmen aufmerksam geworden. Darum bewerbe ich mich hiermit um ein Praktikum von Anfang November bis Ende April 2011. Besonders bin ich an einer Tätigkeit im Bereich Personalberatung interessiert, da Human Resources ein Studienschwerpunkt in meinem betriebswirtschaftlichen Studium an der Fachhochschule Darmstadt darstellt. Nach Abschluss des Studiums strebe ich eine Tätigkeit in diesem Bereich an.

Es würde mich sehr freuen, wenn ich meine persönlichen Fähigkeiten in ihr Unternehmen mit einbringen und mich aktiv an Entwicklungsprozessen beteiligen könnte. Auf diese Weise erhoffe ich mir umfangreiche Erfahrungen in diesem Berufsfeld machen zu können, die mich in meiner Studien- und Berufswahl noch bestärken.

Neben meiner hohen Motivation stehe ich Ihnen unter anderem mit persönlichen Stärken, wie sozialer Kompetenz im Umgang mit Menschen und einer selbstständigen und lösungsorientierten Arbeitsweise zur Verfügung.

Sofern ich Ihr Interesse wecken konnte, freue ich mich sehr über eine Einladung zu einem persönlichen Gespräch.

Mit freundlichen Grüßen

Lukas Bauer

LUKAS BAUER

PERSÖNLICHE DATEN

Anschrift	Haydnstraße 10, 69207 Sandhausen
Mobil	0177 / 5538710
E-Mail	LukasBauer1987@gmail.com
Geburtsdaten	13. August 1987
Geburtsort	Heidelberg
Familienstand	ledig
Nationalität	deutsch

AUSBILDUNG

September 2009 - heute	**Fachhochschule Darmstadt, Darmstadt** Studiengang: BWL
September 2005 – Juli 2006	**Barnesville High School, Barnesville, Ohio, USA** Auslandsaufenthalt
Sept. 1999 – Juli 2008	**Friedrich-Ebert-Gymnasium, Sandhausen** Abitur: 1,7

PRAKTIKA / BERUFSERFAHRUNG

Januar 2010 – heute	**Fitnesspark Pfitzenmeier, Leimen** Studentische Aushilskraft

SPRACHKENNTNISSE

Englisch	verhandlungssicher
Französisch	Grundkenntnisse
Spanisch	Grundkenntnisse

IT-KENNTNISSE

- Microsoft Office-Paket
- SPSS
- LaTex
- Mathematica

HOBBIES

Sport	Fussball, Skifahren
Musik	Saxophon

Sandhausen, XX Oktober 2010

Hochschule Darmstadt
University of Applied Sciences
Haardtring 100
D-64295 Darmstadt

h_da
HOCHSCHULE DARMSTADT
UNIVERSITY OF APPLIED SCIENCES

Herr

Lukas Bauer
Haydnstraße 10
69207 Sandhausen

Name:	Bauer	Vorname:	Lukas	Matr.-Nr.:	102968
Studiengang:	B.Sc. BWL	Eingeschrieben:	WS 2009/2010	Geb. am:	13.08.1987

Prüfungen

Modul	Note	ECTS	Semester
Arbeitsmethodik I	E.T.	2	WS 2009/2010
Grundlagen BWL	1,7	5	WS 2009/2010
Externes Rechnungswesen	2,3	5	WS 2009/2010
Recht I	1,7	5	WS 2009/2010
Volkswirtschaftslehre I	1,3	8	WS 2009/2010
Wirtschaftsmathematik	1,7	4	WS 2009/2010
Organisation und Management	2,0	5	WS 2009/2010
Arbeitsmethodik II	E.T.	2	WS 2009/2010
Marketing	E.T.	5	WS 2009/2010
Internes Rechnungswesen	E.T.	5	SS 2010
Recht II	1,7	5	SS 2010
Volkswirtschaftslehre II	2,0	4	SS 2010
Statistik	1,3	4	SS 2010
Personalmanagement	2,0	5	SS 2010
Wirtschaftsenglisch I	E.T.	5	SS 2010

Wirtschaftsinformatik I	E.T.	5	SS 2010
Logistik	2,0	5	SS 2010
Investition und Finanzierung	1,3	5	SS 2010

Stefan Ulrich

FACHHOCHSCHULE DARMSTADT - DER REKTOR -

B. Sample application: Unattractive male applicant

Maximilian Schneider
Leipzigerstr. 13
69469 Weinheim

Mobil: 0177 / 4529698
E-Mail: SchneiderMax88@gmail.com

Herr XXX
Firma XYZ
Stuttgart-Mitte
Kronprinzstraße 18
70173 Stuttgart

Weinheim, XX.10.2010

Bewerbung als Praktikant im Bereich `Personalberatung und Recruiting´

Sehr geehrter Herr XXX,

mit Zuversicht bewerbe ich mich bei Ihnen um eine Praktikantenstelle im Bereich `Personalberatung und Recruiting´. Ich befinde mich derzeit im zweiten Jahr meines betriebswirtschaftlichen Studiums und stehe kurz vor einer integrierten Praxisphase von sechs Monaten.

Ich möchte mein theoretisches Fachwissen gerne vertiefen und durch die Arbeit in ihrem Betrieb meine praktischen Erfahrungen erweitern.

Meine hohe Motivation, Flexibilität und Teamfähigkeit sind beste Voraussetzungen für ein erfolgreiches Praktikum in Ihrem Betrieb, zudem verfüge ich durch meine studentische Aushilfstätigkeit bereits über Arbeitserfahrungen in diesem Bereich.
Über eine Einladung zu einem Vorstellungsgespräch würde ich mich sehr freuen. Für weitere Fragen stehe ich ihnen gerne zur Verfügung.

Mit freundlichen Grüßen

Maximilian Schneider

MAXIMILIAN SCHNEIDER

PERSÖNLICHE DATEN

Anschrift	Leipzigerstraße 13
	69469 Weinheim
Mobil	0177 / 4529698
E-Mail	SchneiderMax88@gmail.com
Geburtstag / - ort	07. Januar 1988 in Weinheim
Nationalität	deutsch
Familienstand	ledig

AUSBILDUNG

September 2009 – heute	**Studium an der Fachhochschule Ludwigshafen am Rhein** Studiengang: Controlling, Management und Information (Bachelor)
September 2004 – Juli 2005	**Glenbard West High School, Glen Ellyn, Illinois, USA** Schüleraustausch
September 1999 – Juli 2008	**Dietrich-Bonhoeffer-Gymnasium Weinheim** Abitur: 1,6

PRAKTISCHE ERFAHRUNG

Dezember 2009 – heute	**Freizeitbad Miramar,** Weinheim Kaufmännische Aushilfe

SPRACHEN

Englisch	fließend in Wort und Schrift
Französisch	gute Kenntnisse

EDV-KENNTNISSE

- Systemadministration
- MS Office (Excel, Word, Powerpoint, Access)
- Photoshop

Weinheim, XX. Oktober 2010

BESCHEINIGUNG

Fachhochschule Ludwigshafen am Rhein
University of Applied Sciences

Fachhochschule Ludwigshafen – Prüfungsamt – Ernst-Boehe-Str. 4 – 67059 Ludwigshafen

Herr
Maximilian Schneider
Leipzigerstr. 13
69469 Weinheim

September, 2010

Name:	Schneider	Vorname:	Maximilian	Matr.-Nr.:	611678
Studiengang:	Cont./Managem./Infor.	Eingeschrieben:	WS 2009/2010	Geb. am: In:	07.01.1988 Weinheim

Prüfungen			
Fach	**Note**	**Credits**	**Semester**
Einführungsveranstaltung	E.T.	1	WS 2009/2010
Wirtschaftsmathematik	2,0	5	WS 2009/2010
Grundlagen der Betriebswirtschaftslehre	2,0	5	WS 2009/2010
Betriebswirtschaftliche Funktionen I	1,7	5	WS 2009/2010
Recht	2,0	5	WS 2009/2010
Business English I	E.T.	3	WS 2009/2010
Soft Skills I	E.T.	1	WS 2009/2010
Soft Skills II	E.T.	1	WS 2009/2010
Soft Skills III (Präsentationen deutsch / englisch)	E.T.	3	WS 2009/2010
Wirtschaftsinformatik	E.T.	5	WS 2009/2010
Buchführung	1,7	2	SS 2010
Statistik	1,7	5	SS 2010
Einführung in die Volkswirtschaftslehre	2,0	5	SS 2010
Betriebswirtschaftliche Funktionen II	1,7	7	SS 2010

Betriebswirtschaftliche Funktionen III	1,3	5	SS 2010
Business English II	E.T.	2	SS 2010
BWL Grundfunktionen	1,7	8	SS 2010
Grundzüge betriebl. Informationssysteme	2,0	8	SS 2010
Management I	1,3	8	SS 2010

Im Auftrag
H. Steger
Regierungsangest.

FACHHOCHSCHULE Hochschule für Wirtschaft LUDWIGSHAFEN AM RHEIN

C. Sample application: Attractive female applicant

Haydnstraße 10
69207 Sandhausen
Tel.: 0177 / 5538710
E-Mail: Katrin87Schneider@gmail.com
14. Januar 2011

Sehr geehrte Frau XXX,

auf der Suche nach einem lehrreichen und anspruchsvollen Arbeitsumfeld bin ich auf ihr Unternehmen aufmerksam geworden. Darum bewerbe ich mich hiermit um ein Praktikum von Anfang März bis Ende August 2011. Besonders bin ich an einer Tätigkeit im Bereich Marketing interessiert, da dieser ein Studienschwerpunkt in meinem betriebswirtschaftlichen Studium an der Fachhochschule Darmstadt darstellt. Nach Abschluss des Studiums strebe ich eine Tätigkeit in diesem Bereich an.

Es würde mich sehr freuen, wenn ich meine persönlichen Fähigkeiten in ihr Unternehmen mit einbringen und mich aktiv an Entwicklungsprozessen beteiligen könnte. Auf diese Weise erhoffe ich mir umfangreiche Erfahrungen in diesem Berufsfeld machen zu können, die mich in meiner Studien- und Berufswahl noch bestärken.

Neben meiner hohen Motivation stehe ich Ihnen unter anderem mit persönlichen Stärken, wie sozialer Kompetenz im Umgang mit Menschen und einer selbstständigen und lösungsorientierten Arbeitsweise zur Verfügung.

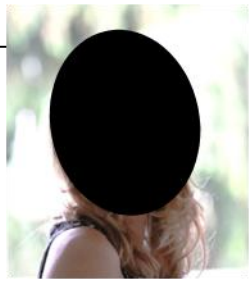
Sofern ich Ihr Interesse wecken konnte, freue ich mich sehr über eine Einladung zu einem persönlichen Gespräch.

Eine Kopie meines Abiturzeugnisses schicke ich Ihnen bei Interesse gerne zu.

Mit freundlichen Grüßen

Katrin Schneider

KATRIN SCHNEIDER



PERSÖNLICHE DATEN

Anschrift	Haydnstraße 10, 69207 Sandhausen
Mobil	0177 / 5538710
E-Mail	Katrin87Schneider@gmail.com
Geburtsdaten	13. August 1987
Geburtsort	Heidelberg
Familienstand	ledig
Nationalität	deutsch

AUSBILDUNG

September 2009 - heute	**Fachhochschule Darmstadt, Darmstadt** Studiengang: BWL
September 2005 – Juli 2006	**Barnesville High School, Barnesville, Ohio, USA** Auslandsaufenthalt
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PRAKTIKA / BERUFSERFAHRUNG

Januar 2010 – heute	**Fitnesspark Pfitzenmeier, Leimen** Studentische Aushilskraft

SPRACHKENNTNISSE

Englisch	verhandlungssicher
Französisch	Grundkenntnisse
Spanisch	Grundkenntnisse

IT-KENNTNISSE

- Microsoft Office-Paket
- SPSS
- LaTex
- Mathematica

HOBBIES

Sport	Fussball, Skifahren
Musik	Saxophon

Sandhausen, 14 Januar 2011

Hochschule Darmstadt
University of Applied Sciences
Haardtring 100
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HOCHSCHULE DARMSTADT
UNIVERSITY OF APPLIED SCIENCES

Frau

Katrin Schneider
Haydnstraße 10
69207 Sandhausen

Name:	**Schneider**	Vorname:	**Katrin**	Matr.-Nr.:	**102968**
Studiengang:	**B.Sc. BWL**	Eingeschrieben:	**WS 2009/2010**	Geb. am:	**13.08.1987**

Prüfungen

Modul	Note	ECTS	Semester
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Volkswirtschaftslehre I	1,3	8	WS 2009/2010
Wirtschaftsmathematik	1,7	4	WS 2009/2010
Organisation und Management	2,0	5	WS 2009/2010
Arbeitsmethodik II	E.T.	2	WS 2009/2010
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Volkswirtschaftslehre II	2,0	4	SS 2010
Statistik	1,3	4	SS 2010
Personalmanagement	2,0	5	SS 2010
Wirtschaftsenglisch I	E.T.	5	SS 2010
Wirtschaftsinformatik I	E.T.	5	SS 2010

Logistik	2,0	5	SS 2010
Investition und Finanzierung	1,3	5	SS 2010

Stefan Ulrich

FACHHOCHSCHULE DARMSTADT · DER REKTOR ·

D. Sample application: Unattractive female applicant

Sarah Müller
Leipzigerstr. 13
69469 Weinheim

Mobil: 0177 / 4529698
E-Mail: Sarah.Mueller.1988@gmail.com

Villeroy & Boch AG
66688 Mettlach

Weinheim, 14.01.2011

Bewerbung als Praktikant im Bereich `Marketing´

Sehr geehrte Frau Lenhof,

mit Zuversicht bewerbe ich mich bei Ihnen um eine Praktikantenstelle im Bereich `Marketing´. Ich befinde mich derzeit im zweiten Jahr meines betriebswirtschaftlichen Studiums und stehe kurz vor einer integrierten Praxisphase von sechs Monaten.

Ich möchte mein theoretisches Fachwissen gerne vertiefen und durch die Arbeit in ihrem Betrieb meine praktischen Erfahrungen erweitern.

Meine hohe Motivation, Flexibilität und Teamfähigkeit sind beste Voraussetzungen für ein erfolgreiches Praktikum in Ihrem Betrieb, zudem verfüge ich durch meine studentische Aushilfstätigkeit bereits über Arbeitserfahrungen in diesem Bereich.
Über eine Einladung zu einem Vorstellungsgespräch würde ich mich sehr freuen. Für weitere Fragen stehe ich ihnen gerne zur Verfügung.
Bei Interesse sende ich Ihnen gerne eine Kopie meines Abiturzeugnisses.

Mit freundlichen Grüßen

Sarah Müller

SARAH MÜLLER

PERSÖNLICHE DATEN

Anschrift	Leipzigerstraße 13
	69469 Weinheim
Mobil	0177 / 4529698
E-Mail	Sarah.Mueller.1988@gmail.com
Geburtstag / - ort	07. Januar 1988 in Weinheim
Nationalität	deutsch
Familienstand	ledig

AUSBILDUNG

September 2009 – heute	**Studium an der Fachhochschule Ludwigshafen am Rhein** Studiengang: Controlling, Management und Information (Bachelor)
September 2004 – Juli 2005	**Glenbard West High School, Glen Ellyn, Illinois, USA** Schüleraustausch
September 1999 – Juli 2008	**Dietrich-Bonhoeffer-Gymnasium Weinheim** Abitur: 1,6

PRAKTISCHE ERFAHRUNG

Dezember 2009 – heute	**Freizeitbad Miramar,** Weinheim Kaufmännische Aushilfe

SPRACHEN

Englisch	fließend in Wort und Schrift
Französisch	gute Kenntnisse

EDV-KENNTNISSE

- Systemadministration
- MS Office (Excel, Word, Powerpoint, Access)
- Photoshop

Weinheim, 14. Januar 2011

BESCHEINIGUNG

Fachhochschule Ludwigshafen am Rhein
University of Applied Sciences

Fachhochschule Ludwigshafen – Prüfungsamt – Ernst-Boehe-Str. 4 – 67059 Ludwigshafen

Frau
Sarah Müller
Leipzigerstr. 13
69469 Weinheim

Januar, 2011

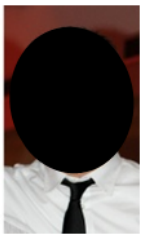
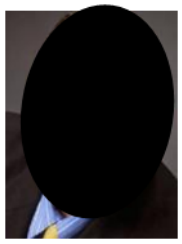
Name:	Müller	Vorname:	Sarah	Matr.-Nr.:	611678
Studiengang:	Cont./Managem./Infor.	Eingeschrieben:	WS 2009/2010	Geb. am: In:	07.01.1988 Weinheim

Prüfungen			
Fach	**Note**	**Credits**	**Semester**
Einführungsveranstaltung	E.T.	1	WS 2009/2010
Wirtschaftsmathematik	2,0	5	WS 2009/2010
Grundlagen der Betriebswirtschaftslehre	2,0	5	WS 2009/2010
Betriebswirtschaftliche Funktionen I	1,7	5	WS 2009/2010
Recht	2,0	5	WS 2009/2010
Business English I	E.T.	3	WS 2009/2010
Soft Skills I	E.T.	1	WS 2009/2010
Soft Skills II	E.T.	1	WS 2009/2010
Soft Skills III (Präsentationen deutsch / englisch)	E.T.	3	WS 2009/2010
Wirtschaftsinformatik	E.T.	5	WS 2009/2010
Buchführung	1,7	2	SS 2010
Statistik	1,7	5	SS 2010
Einführung in die Volkswirtschaftslehre	2,0	5	SS 2010

Betriebswirtschaftliche Funktionen II	1,7	7	SS 2010
Betriebswirtschaftliche Funktionen III	1,3	5	SS 2010
Business English II	E.T.	2	SS 2010
BWL Grundfunktionen	1,7	8	SS 2010
Grundzüge betriebl. Informationssysteme	2,0	8	SS 2010
Management I	1,3	8	SS 2010

Im Auftrag
H. Stege
Regierungsangest.

E. Photos used in this study[12]

Attractive Candidates	Unattractive Candidates
	
	
	
	
	
	

[12] Photos have been anonymized due to privacy issues.

F. Beauty-Hungry Occupations

There are four beauty-hungry occupations which are present in my dataset:

Table A1. Distribution of Beauty-Hungry Occupations

Occupation	**Full**	**Male**	**Female**
Beauty-Hungry	66.9%	65.0%	67.8%
	(662)	(312)	(346)
Marketing	20.0%	18.8%	20.8%
	(198)	(90)	(106)
Sales	17.6%	18.3%	16.9%
	(174)	(88)	(86)
Human Resources	16.2%	18.3%	14.5%
	(160)	(88)	(74)
Consulting	13.1%	9.6%	15.6%
	(130)	(46)	(80)
Beauty-Indifferent	33.1%	35.0%	32.2%
	(328)	(168)	(164)
Controlling	12.7%	14.2%	12.2%
	(126)	(68)	(62)
Accounting	11.9%	12.9%	11.4%
	(118)	(62)	(58)
Office Assistant	8.5%	7.9%	8.6%
	(84)	(38)	(44)

Notes: This table shows the distribution of beauty-hungry occupations, absolute numbers are in parentheses.

PAPER 2

THE SIGNALING EFFECT OF BEAUTY

ABSTRACT

Beauty was shown to have a positive impact on one's labor market outcome by Hamermesh and Biddle (1994), who dubbed it the 'beauty premium'. Later research in psychology then showed beauty to serve as a signal for intelligence (Kanazawa and Kovar, 2004). Results of the present study, using data from the National University of La Plata, Argentina, show that physically attractive employees experience a 'beauty premium' due to beauty being a signal for intelligence, rather than as a result of expected productivity directly related to physical attractiveness or employer discrimination. The 'beauty premium' is found to hold for low- and mid-tenure employees, but not to hold for high-tenure employees. An 'intelligence premium', on the contrary, is shown to increase over job tenure. These results are explained by a signaling effect of beauty, which weakens as employers observe more about their employees over job tenure.

1. Statement of the Problem

Ever since Mincer´s (1974) pioneering work on 'Schooling, Experience and Earnings', many economists have tried to identify the most relevant factors determining wages. Identification strategies have included regressing wages on various sets of determinants including gender (Blau and Kahn, 1996), health status (Schultz, 2002), race (Neal and Johnson, 1996), and intelligence (Plug, 2000). Some scholars have even analyzed the effect of height (Persico et al., 2004) and obesity (Sargent and Blanchflower, 1994) on the level of wages. But of more importance for the present project is the fact that more than 30 years ago psychologists confirmed that one´s physical attractiveness is advantageous to securing employment. Inspired by this result, economists began to analyze the effect of physical attractiveness on the labor market more generally.

Physical attractiveness can have a positive impact on one's probability of being hired, as well as increase the offered wage once it comes to employment (e.g. Frieze et al., 1991; Hamermesh and Biddle, 1994). The finding that physical attractiveness has a positive effect on an individual's labor market outcome has been shown to exist across all types of industries. It has also been the subject of more empirical investigation (e.g. Averett and Korenman, 1996; Mulford et al., 1998; Bowles et al., 2001), which has repeatedly confirmed that beauty indeed does have a positive impact on wages. Several studies (Harper, 2000; Bowles et al., 2001; French, 2002; Fletcher, 2009) postulate that people who are assessed as attractive earn more than unattractive people.

Frieze et al. (1991) explored how physical attractiveness is related to wages using longitudinal data on 737 MBA graduates. They found that more attractive men had higher starting salaries and that the earning differentials remained over time. For women, however, there was no effect of physical attractiveness on their starting wages, but they earned more later in their careers. Hamermesh and Biddle (1994) found a significant premium to beauty for both men and women, with attractive employees earning more than unattractive employees. Good-looking employees earn about 10 - 15% more than do plain employees. In a follow-up paper, Biddle and Hamermesh (1998) extended their earlier study by tracking the earnings over time of a large sample of graduates from one law school. Based on the rating of matriculation photographs, the results showed a positive correlation between physical attractiveness and wages. Physically attractive attorneys earned more than others after five years of experience and this differential grew with experience. In addition to the studies conducted in the US, Harper (2000) used British longitudinal data drawn from the National Child Development Study (NCDS) to examine the effect of physical attractiveness of 7 and 11 year-olds on their labor market outcome after 26 and 22 years, respectively. Harper (2000) concluded that physical attractiveness is as important for men as it is for women. The penalty for plainness was higher for men (15%) than for women (11%).

There are also laboratory studies which find that beauty matters in various kinds of social interactions (e.g. Solnick and Schweitzer, 1999; Wilson and Eckel, 2006; Andreoni and Petrie, 2008). These laboratory experiments demonstrate that cooperativeness, as well as other character traits, are indeed expected of attractive people. Attractive individuals are given higher offers in the ultimatum game (Solnick and Schweitzer, 1999), are trusted more in the trust game (Wilson and Eckel, 2006) and

are expected to be more cooperative in the public goods game (Andreoni and Petrie, 2008) than are unattractive individuals. According to Eckel and Wilson (2004), physical attractiveness is often used as a shortcut in forming an opinion about an unfamiliar individual's trustworthiness and cooperativeness. Although this cooperativeness is assumed to enhance one´s job performance, the effect of beauty disappears, Andreoni and Petrie (2008) argue, when information about the employee's true job performance is revealed.

In the psychological literature, there is some evidence that intelligence is not assessed independently of the assessment of an individual's beauty (e.g. Zebrowitz et al., 2002; Kanazawa and Kovar, 2004), insofar as beauty functions as a signal that indicates intelligence. In other words, the more attractive an employee is deemed to be, the more intelligent she is presumed to be.[13] Kanazawa and Kovar (2004) offer a theory that could potentially explain why intelligence is positively correlated with physical attractiveness, namely that more intelligent men are more likely to attain higher social and economic status than less intelligent men. Higher status men are more likely to get married to more beautiful women, who then pass on their genes to their disproportionately intelligent and attractive children. Given the imperfection in assortative matching, however, the correlation between intelligence and physical attractiveness is far less than perfect. The theoretical finding of Kanazawa and Kovar (2004) provides new insight into the earlier empirical work of Zebrowitz et al. (2002). In their experiment, Zebrowitz et al. (2002) showed 804 photos to 24 individuals, who were asked to state whether the photographed individual is intelligent or not. The photographed people already had both their beauty and their intelligence measured in a

[13] For a detailed review about physical attractiveness signaling intelligence, see Zebrowitz et al., 2002.

previous study (1993). The authors took the results of the 2002 study and drew a positive correlation between beauty and measured intelligence.

To summarize, the existing literature offers three explanations for the 'beauty premium'. The economic literature focuses on the positive link between beauty and wage differentials, explaining the link as being due to pure employer discrimination or to beauty as a productive factor. The psychology literature attempts to explain the 'beauty premium' by drawing a link between beauty and measured intelligence, in which more beautiful people are surmised to be more intelligent. My research combines the economic and psychological approaches, by empirically examining their explanations for the 'beauty premium'. The contribution of this paper is in empirically distinguishing the merits of these explanations.

I begin the analysis by verifying that the 'beauty premium' exists in the dataset utilized in this study and is consistent with previous literature. The three explanations for this premium in the economic and psychology literature are then explored: productivity-based, in which an employee's beauty is a productive factor for the firm; signaling-based, in which beauty functions as a signal for intelligence; and employer discrimination-based, in which employers prefer attractive over unattractive employees. The evidence of this paper strongly supports signaling as the source of the 'beauty premium'. There is a 'beauty premium' for low- and mid-tenure employees; the premium disappears, however, for high-tenure employees. On the other hand, the impact of intelligence grows in size over job tenure, creating a substantial 'intelligence premium'. When the employer presumably does not have full information about the employee's intelligence and abilities, beauty may serve as a signal for these capabilities.

As intelligence and abilities are gradually revealed on the job, beauty becomes less meaningful as a signal.

The remainder of the paper is organized as follows. Section 2 provides information about the data. Section 3 outlines the estimated model and discusses the main results with an emphasis placed on the effect of beauty as a signal for an employee's intelligence. Section 4 concludes.

2. Data

The data come from the National University of La Plata (Universidad Nacional de La Plata), Argentina.[14] The data was drawn from a random sample of 929 individuals in the area of Gran La Plata, including the cities of La Plata, Berisso, and Ensenada. Gran La Plata is inhabited by 600 000 people in the vicinity of Buenos Aires. The broad in-home survey was composed of 70 questions, including an IQ test as a measure of general intelligence. I normalized this measure to have a standard deviation equal to one. The test used to measure the respondents' general intelligence is one of the most commonly used intelligence tests[15], the so-called Wechsler Adult Intelligence Scale (WAIS**).** The Wechsler Adult Intelligence Scale intelligence quotient (IQ) tests are the primary clinical instruments used to measure adult and adolescent intelligence. The WAIS consists of several different standardized tests used to evaluate reasoning and intellectual abilities. The original WAIS (Form I) was published in February 1955 by David Wechsler, as a revision of the Wechsler-Bellevue Intelligence Scale. The WAIS–

[14] Gratefully acknowledged is the support of Professor Teraz who generously provided me with his dataset.

[15] The four most commonly used intelligence tests are: Stanford-Binet Intelligence Scale; Wechsler-Adult Intelligence Scale; Wechsler Intelligence Scale for Children; Wechsler Primary & Preschool Scale of Intelligence.

III, a subsequent revision of the WAIS, released in 1997, was employed in the present dataset. The WAIS-III provides scores for Verbal IQ, Performance IQ, and Full Scale IQ, along with four secondary indices (Verbal Comprehension, Working Memory, Perceptual Organization, and Processing Speed). A breakdown of the test can be found in Appendix A.

The survey provides data on the respondents´ physical attractiveness as well as on the usual labor market variables of interest for economists. The survey has the advantage, for the purposes of this research, of including substantial background information on the respondents. Similar to the work of Biddle and Hamermesh (1998), 5 male and 5 female randomly chosen students from the University of La Plata independently rated, in random order, the frontal facial, colored photographs of all 929 participants on a 10-point scale, ranging from 1 (homely) to 10 (strikingly attractive). All photographs were taken by a professional photographer at the time of the interview and the participants were told to wear business attire. All photographs are of standard size for application photos (65 mm x 45 mm). Because the photographed individuals are of different age, the raters were instructed to rate the person in the photograph relative to others in the same age group.

There are two potential caveats that might result in possible measurement errors. First, an ideal measure of beauty would account for all features that make a visual impact on others, i.e. physical characteristics, body language, and grooming (see Langlois et al., 2000). A photograph, of course, can only capture facial features. A second caveat is that raters may differ in their judgements of (un) attractiveness, which may lower the efficiency of the estimates. Work by Hatfield and Sprecher (1986), however, suggests that assessements of beauty by raters tend to stay quite uniform, and

change slowly over time. Nevertheless, the economic outcome of this analysis is unlikely to be affected by these errors, as the photographs are homogeneous in quality and are taken under the same interview-ready conditions. Further, unlike an interviewer-rating measure (Hamermesh and Biddle, 1994), raters have no information about the socio-economic status of the photographed individuals; it is therefore unlikely that the raters' assessment of physical attractiveness is affected by this information.

Although the dataset includes information on gender, age, years of education, monthly wage, a general factor for intelligence, and a measure for physical attractiveness, which has been normalized to have a standard deviation equal to one, it does not contain a variable for 'years of work experience', and hence age is used as a proxy for 'years of work experience'.[16]

[16] Information on the individuals' race, gender, nationality, health status, marital status, spousal wage, number of children, number of siblings, parental health, parental education and school characteristics is also available.

3. Methodology and Results

3.1 Baseline Results

Of 929 individuals in the sample, 353 are retirees.[17] Only 576 are used in this empirical analysis, as the focus is on the working age population. Of these 576 individuals, just 512 report their wage. The remaining 64 do not report their wage: 25 are working, and 39 are unemployed.

Given that a number of the respondents did not report their wage, selectivity becomes an issue and therefore needs to be addressed. For this reason, the Heckman selection model is run, which allows, by using information from non-working individuals, to improve the estimates of the parameters in the regression model. The Heckman procedure provides consistent, asymptotically efficient estimates for all parameters in the model. The Heckman selection model requires at least one exclusion restriction for identification of the wage equation. Given the limitations of the dataset, I use spousal wage and number of children as an exclusion restriction for identification of the wage equation as the variables affecting the probability of working, but I exclude them from the wage equation as they are unlikely to have an impact on an individual's current wage (e.g. Korenman and Neumark, 1992; Bičáková et al., 2011).

For the purpose of continuity with the previous literature, I run the regressions with intelligence (e.g. Harper, 2000; Fletcher, 2009) and without intelligence (e.g.

[17] The retirement age in Argentina is 65 for men and 60 for women.

Hamermesh and Biddle, 1994; French, 2002). I first verify the existence of the 'beauty premium' by regressing log wages on education, experience, experience squared, beauty, and a set of control variables including race, gender, nationality, health status, marital status, number of siblings, parental education and parental health (see French, 2002). To the extent that beauty might be taken as a proxy for intelligence, this regression might overestimate the effect of beauty; I thus include intelligence into a second regression (see Fletcher, 2009). As intelligence has been shown to be an important factor in determining wages (e.g. Plug, 2000; Hartog, 2001), I later focus on the regressions controlling for intelligence in order to determine whether beauty acts as a signal for intelligence. The results of estimating the standard Heckman model (1979) for both regressions are shown in Table 1.[18]

[18] See section 3.3 for OLS results as an alternative estimation method.

Table 1. Entire Sample

	(1)	(2)	(3)	(4)	(5)	(6)
Education	.091***	.089***	.093***	.052***	.051***	.048***
	(.007)	(.0064)	(.0072)	(.0068)	(.0062)	(.0056)
Experience	.051***	.05***	.053***	.035***	.033***	.031***
	(.006)	(.0059)	(.0062)	(.0046)	(.0045)	(.0036)
Experience^2	.0009***	.0008***	.0008***	.0008***	.0009***	.0004***
	(.000096)	(.000094)	(.000085)	(.0001)	(.000125)	(.0001)
Beauty	.062***	.059***	.07***	.012**	.009*	.014**
	(.0069)	(.0056)	(.0074)	(.0055)	(.0075)	(.006)
Intelligence	–	–	–	.273***	.263***	.268***
				(.029)	(.031)	(.028)
Mills (spousal wage)	1.63***	–	–	.623	–	–
	(.074)			(3.11)		
Mills (# of children)	–	.98***	–	–	.146	–
		(.065)			(.82)	
Mills (both)	–	–	1.60***	–	–	.572
			(.089)			(2.86)
Intercept	2.2***	3.63***	2.23***	3.66***	3.12***	3.67***
	(.18)	(.27)	(.23)	(.28)	(.24)	(.33)
Control for Selection	Yes	Yes	Yes	Yes	Yes	Yes
Observations	576	576	576	576	576	576

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A10 (in the Appendix).

An important point to take from Table 1 is that there is a significant 'beauty premium' for the entire sample when not controlling for intelligence (columns (1), (2), and (3)), in the range of 0.059 to 0.07. Of even more importance is the small, but still significant, 'beauty premium' when intelligence is controlled for (columns (4), (5), and (6)). The coefficient on beauty is in the range of 0.009 to 0.014, meaning that, ceteris paribus, a one standard deviation increase in the utilized measure of beauty boosts the wage by 0.9 to 1.4%. At the same time, the coefficient on intelligence is highly significant and strongly affects wages. The coefficient on intelligence is in the range of 0.26 to 0.27; a one standard deviation increase in intelligence thus raises the wage level by 26 to 27%.

The presence of intelligence, however, as a determining factor of wages lowers the effect of education considerably, from the standard 9% (Psacharopolous and Patrinos, 2002) to 5%. This effect is discussed at length by Rosen (1977) and Hartog (2001). Their argument is that the achievements in education act as a signal that one has certain abilities (see Spence, 1973). As a result, when the abilities of an employee are incorporated into the regression in the form of intelligence, then there is some part of education that ceases to have an effect on the determination of wages.

To determine whether the positive effect of beauty exists across genders, I split the sample and run two separate regressions, one for the female sample and one for the male sample. The results show that the 'beauty premium' is slightly higher for women than it is for men. If not controlling for intelligence, the 'beauty premium' for men is in the range of 5.9 – 6.8%, and for women it is in the range of 6.3 – 7.6% (see Table A2 in the Appendix). Controlling for intelligence, the range is 0.9 – 1.2% for men and 1.4 – 1.8% for women (see Table A4 in the Appendix).

3.2 Possible Explanations for the Baseline Results

Having shown that the labor market does reward physical attractiveness, I now consider three potential explanations of the 'beauty premium' suggested by the existing economic and psychological literature (see section 1).

(1) Productivity-based. This theory asserts that an employee's level of physical attractiveness is a productive asset to the firm. An improvement in firm productivity could arise from customer discrimination, with certain customers preferring to deal with better-looking employees, or there may be occupations in which physical attractiveness enhances the employee's ability to engage in productive interactions with coworkers (e.g. Becker, 1971; Harper, 2000).

(2) Signaling-based. According to Spence (1973), in most hiring processes the employer is not sure about the real productive capabilities of the potential employee, nor will this information be available shortly after their employment. Often the job may take time to learn and require specific training. Given that it takes time to learn about an individual's true productive capabilities, the hiring process is thus affected by uncertainty. What the employer can observe, however, are characteristics and attributes of the applicant. Based on this information, the employer draws inferences about the behavior and abilities of the applicant. In this regard physical attractiveness might play a crucial role in the hiring process since the psychology literature tells us that individuals ascribe a number of positive traits to physically attractive people (e.g. Feingold, 1992). Attractive individuals are expected to be more sociable and intelligent than less attractive individuals (e.g. Feingold, 1992; Langlois et al., 2000).

The employee's physical attractiveness thus may be taken by the employer as a signal for intelligence or ability. Employers may infer that attractive employees will perform better than unattractive employees, and are therefore willing to reward them with higher wages. Exact information about the employee's intelligence and abilities per se is unobservable to the employer at the time employees are hired, which is why inferences are drawn about the employees' capabilities based on their physical attractiveness (e.g. Eckel and Wilson, 2004). It is therefore possible that physical attractiveness is more important at the beginning of a job but evaporates with tenure. If physical attractiveness indeed serves as a signal for the applicant's intelligence or abilities, then the effect of the 'beauty premium' should be positive and significant for job starters and diminish over time.

(3) Employer discrimination-based. Employers prefer employees with certain physical characteristics which are unrelated to their productivity. These preferences may translate into higher wages for more attractive employees (e.g. Becker, 1971; Hamermesh and Biddle, 1994).

To see the merits of the productivity-based explanation, I assess to what extent physical attractiveness may affect an employee's productivity in a given occupation. I split the occupations into 'beauty-hungry' and 'beauty-indifferent'. A practical obstacle to this task is identifying occupations where attractiveness might plausibly lead to greater productivity ('beauty-hungry' occupations). In the absence of a widely accepted objective measure for determining beauty-hungry occupations, I use a survey of employers' views of the importance of an employee's appearance in filling job vacancies (Holzer, 1993). Details on the classification of occupations into beauty-hungry and beauty-indifferent may be found in Appendix B. The standard expectation

would be that attractiveness matters more in beauty-hungry occupations, i.e. those with a lot of customer and coworker interaction such as professional and service occupations. The results of estimating the standard Heckman model by beauty-hungry and beauty-indifferent occupations are as shown in Table 2.

Table 2. Occupational Sorting Entire Sample

	(1)	(2)	(3)
Education	.023**	.019**	.022**
	(.012)	(.01)	(.011)
Experience	.011*	.009*	.009*
	(.0092)	(.0077)	(.0075)
Experience^2	.00016	.00012	.00016
	(.0005)	(.00048)	(.00064)
Beauty	.006	.004	.009
	(.05)	(.02)	(.035)
Beauty-Hungry Occ.	.14	.14	.15
	(.43)	(.44)	(.51)
Interaction Term (Beauty – Beauty-Hungry Occ.)	-.07	-.06	-.07
	(.26)	(.28)	(.29)
Intelligence	.269***	.256***	.259***
	(.039)	(.034)	(.036)
Mills (spousal wage)	.724	–	–
	(2.3)		
Mills (# of children)	–	.253	–
		(.74)	
Mills (both)	–	–	.697
			(2.0)
Intercept	3.9***	3.5***	3.7***
	(0.43)	(0.38)	(0.41)
Control for Selection	Yes	Yes	Yes
Observations	576	576	576

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A11 (in the Appendix).

The estimated coefficient on the interaction term is statistically insignificant, which would indicate that attractiveness is no more important in occupations where face-to-face interaction is higher, or where attractiveness might be strongly associated with greater productivity. Based on these results, the productivity-based explanation is not backed up by evidence. Evidence for viewing productivity as the source of the 'beauty premium' is similarly lacking for low-, mid- and high-tenure groups (length of time on the job). Table A4 gives details.

To see the merits of the signaling-based explanation, I split the sample and run three separate regressions, one for low-tenure employees (tenure of less than 2 years), one for mid-tenure employees (tenure between 2 and 5 years) and one for high-tenure employees (tenure more than 5 years). Table 3 displays the coefficients and standard errors for the estimates for each of the three subsamples, while still controlling for the same set of variables as in Table 1, as well as controlling for selection.

Table 3. Tenure-Specific Regressions

	Tenure < 2 years			Tenure 2 - 5 years			Tenure > 5 years		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education	.055*** (.0069)	.053*** (.0066)	.054*** (.0068)	.041*** (.0055)	.04*** (.0053)	.036*** (.005)	.038*** (.005)	.031*** (.0043)	.032*** (.0043)
Experience	.05*** (.0059)	.044*** (.0064)	.042*** (.0064)	.041*** (.0056)	.035*** (.0049)	.033*** (.0044)	.033*** (.0046)	.029*** (.0041)	.03*** (.0042)
Experience^2	.0007*** (.0001)	.0006*** (.000085)	.0004*** (.0001)	.0004*** (.000058)	.00048*** (.000067)	.00045*** (.00006)	.0005*** (.00007)	.00049*** (.000063)	.00044*** (.000063)
Beauty	.04*** (.0075)	.056*** (.0095)	.063** (.032)	.029* (.017)	.038* (.022)	.048* (.026)	.006 (.025)	.0076 (.038)	.008 (.08)
Intelligence	.281*** (.047)	.268*** (.045)	.272*** (.045)	.341*** (.057)	.328*** (.055)	.332*** (.056)	.352*** (.058)	.344*** (.049)	.362*** (.051)
Mills (spousal wage)	.524 (2.62)	–	–	.662 (3.31)	–	–	.712 (3.56)	–	–
Mills (# of children)	–	.122 (.61)	–	–	.237 (1.19)	–	–	.318 (1.59)	–
Mills (both)	–	–	.624 (1.78)	–	–	.597 (1.81)	–	–	.523 (1.54)
Intercept	3.06*** (.24)	2.52*** (.21)	3.07*** (.27)	2.4*** (.19)	2.38*** (.20)	2.52*** (.23)	2.93*** (.21)	2.41*** (.19)	2.99*** (.24)
Control for Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	189	189	189	171	171	171	177	177	177

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A12 (in the Appendix).

Table 3 indicates that the 'beauty premium' is of more importance for low- and mid-tenure employees than for high-tenure employees. A 'beauty premium' of approximately 5.3% exists for low-tenure employees, and approximately 3.8% for mid-tenure employees. The premium then drops precipitously and becomes statistically insignificant (approximately 0.007) for high-tenure employees.[19] These results suggest that there may indeed be signaling in the hiring process, where physical attractiveness serves as a signal of intelligence and productive capabilities. In particular, inferences are drawn about the employee's capabilities based on his physical attractiveness at the beginning of tenure on the job. In the case of high-tenure employees (tenure more than 5 years) physical attractiveness becomes irrelevant, because any inferences that were drawn connecting the new employees' physical attractiveness with intelligence or abilities may have dissipated over the course of their job tenure.

Another finding in support of the signaling-based explanation is that while the coefficient on beauty diminishes with tenure, the coefficient on intelligence gradually increases with tenure (Table 3). While low-tenure employees experience an 'intelligence premium' of approximately 27%, mid-tenure employees receive a premium of 33%, and high-tenure employees, 35%.[20] The source of this pattern may be as follows. As the employer does not observe the true measure of intelligence, but rather observes a noisy measure of intelligence, the coefficient on intelligence is lower early in tenure and grows as true intelligence is gradually observed. Early in job tenure, attractiveness is used to compensate for the fact that the employer does not have full

[19] I tested whether the beauty coefficients in columns (1), (4) and (7) are statistically different from each other. I conducted the same test for difference in columns (2), (5) and (8), and columns (3), (6) and (9). The tests confirm that the decrease in the coefficient of beauty across tenure is statistically significant.

[20] I similarly tested whether the difference in intelligence coefficients in columns (1), (4) and (7), columns (2), (5) and (8), and columns (3), (6) and (9) are statistically different from each other. The increase in the coefficient of intelligence across tenure is not statistically significant.

information about the employee's true abilities and intelligence. The longer the employee's tenure, however, the more precisely the employer can observe the true productive abilities and intelligence of the employee. The effect of beauty hence diminishes, while the effect of intelligence grows.

A final point in support of the signaling-based story is the positive correlation between beauty and measured intelligence (corr. 0.31), which is consistent with previous research. Zebrowitz et al. (2002), for instance, drew a positive correlation between beauty and perceived intelligence (corr. 0.53) at all ages, and attractiveness was also significantly correlated with measured intelligence (corr. 0.39). This positive correlation between physical attractiveness and measured intelligence (corr. 0.31) suggests that it is reasonable to take beauty as a signal for intelligence.

Support for the employer discrimination-based explanation would need a positive and significant coefficient on beauty for the entire sample and for all tenure groups. In other words, we should see 'beauty premia' for any length of tenure. As this is not the case (see Table 1 and Table 3), the employer discrimination-based is not supported by the data.

3.3 Sensitivity of the Results

An important issue concerning any beauty ranking is that it is ordinal rather than cardinal in nature. The presented results, which are based on a particular cardinal scale, may therefore be sensitive to positive monotone transformations of this scale. The sensitivity of the presented results are thus subjected to four separate transformations: a convex one, a concave one, a two-step function, and a three-step function. For the

convex transformation, I take the exponential of the beauty measure, e^{beauty}, which is then normalized to have a standard deviation equal to one. The logarithm of the beauty measure, *ln(beauty)*, is taken for the concave transformation; this is again normalized to have a standard deviation equal to one. For the two-step function transformation, the data is split into two groups: one group comprised of those assigned 1, 2, 3, 4 and 5 on the beauty measure, and the other group comprised of those assigned 6, 7, 8, 9 and 10. For the three-step function, as motivated by Hamermesh and Biddle (1994), the beauty measure has been divided into three classes: Below Average (1, 2, 3), Average (4, 5, 6, 7), Above Average (8, 9, 10).[21]

All regressions run with the original beauty measure are run again with these four transformations. Results for all regressions show no qualitative differences between the baseline results and the results using the four transformed measures.[22] Although the coefficients differ, the sign and significance are very similar. These robustness checks thus should allay concerns that the results are sensitive to the particular cardinalization of the ordinal beauty scale.

3.4 Methodological Issues

Potential objections may be raised regarding the validity of instruments used for the first-stage estimation. To allay these concerns, I employ an empirical measure of the strength of the instruments, the *F*-statistic, to test their significance in the first-stage regression. Generally, an *F*-statistic over 10 is required to suggest that the instruments are sufficiently strong (e.g. Staiger and Sock, 1997). With a first-stage *F*-statistic of

[21] Using the 3-step transformation, results showed a higher 'beauty premium'; namely, the wages of people with above-average looks are higher than those with below-average looks (7 – 9%). The premium still declines over job tenure and becomes insignificant, while the 'intelligence premium' increases.
[22] Complete results are available from the author upon request.

58.61, using both instruments, a first-stage *F*-statistic of 32.78, using spousal wage as the sole instrument, and a first-stage *F*-statistic of 28.39, using the number of children as the sole instrument, I can be confident that the instruments are strong. In addition, the model is overidentified, making it possible to use available information to test whether the instruments are uncorrelated with the residuals of the second-stage estimation. I first use spousal wage as the sole instrument, then test whether the residuals of the second-stage estimation are uncorrelated with the excluded instrument, the number of children. The second step reverses this procedure, by using the number of children as the sole instrument, and checking for correlation between the residuals of the second-stage estimation with spousal wage. These tests show the instruments to be strong, by being uncorrelated with the error term in the second-stage estimation.

Clearly, it is not appropriate to use OLS estimation if there is selectivity. However, if I run all regressions using standard OLS, the obtained results still show similar patterns and reveal no qualitative differences from the Heckman model.[23]

Another potential issue may be the endogeneity of physical attractiveness, since some might invest in enhancing their physical appearance in order to get a higher return on wages. The existing literature asserts, however, that there is no endogeneity from wages to physical attractiveness, and therefore simple empirical techniques can reliably test for the existence of a 'beauty premium' (e.g. Hamermesh and Biddle, 1994; Biddle and Hamermesh, 1998). It is argued that endogeneity from wages to physical attractiveness is of minor concern, because if individuals "buy" physical attractiveness throughout their life, then the relationship between physical attractiveness and wages should be weaker for younger employees than for older employees, which is not the

[23] Complete results are available from the author upon request.

case in my dataset. In fact, if I restrict the sample to employees aged 18–35, the ‘beauty premium’ is larger (Table A4, in the Appendix) than the basic estimates in Table 1. More recent literature bolsters the argument that there is no endogeneity between physical attractiveness and achievement. Mobius and Rosenblatt (2006) overcome the reverse causality issue through their experimental models. Even empirical research argues that, by using a beauty measure instead of an interviewer-rating measure, reverse causality is minimized because the rater’s assessment of physical attractiveness is unlikely to be affected by any other information about the photographed individuals, such as socioeconomic status (Biddle and Hamermesh, 1998).

4. Conclusion

The preceding analysis examined the source of the ‘beauty premium’. Three potential explanations were put forward: productivity-based, signaling-based, and employer discrimination-based. The presented evidence strongly suggests that physically attractive employees experience a ‘beauty premium’ due to beauty being a signal for intelligence. The signaling story is discerned from patterns in the movement of the ‘beauty premium’ and ‘intelligence premium’ over the course of job tenure. Specifically, the ‘beauty premium’ is found to be statistically significant only for low- and mid-tenure employees, but to be statistically insignificant for high-tenure employees. This result is explained as being due to a signaling effect, which weakens as employers observe more about their employees over job tenure. This weakening is substantiated by the rise in the ‘intelligence premium’ over job tenure: as employers learn more about their employees, beauty no longer serves as a signal for intelligence, since intelligence can be more directly observed.

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6. Appendix

A. Breakdown of the Wechsler Adult Intelligence Scale (WAIS)

The Verbal IQ test includes seven tests and provides two subindexes: verbal comprehension and working memory.

The Verbal comprehension index includes the following tests:

- Information
- Similarities
- Vocabulary

The Working memory index includes:

- Arithmetic
- Digit Span

The Performance IQ test includes six tests and also provides two subindexes: perceptual organization and processing speed.

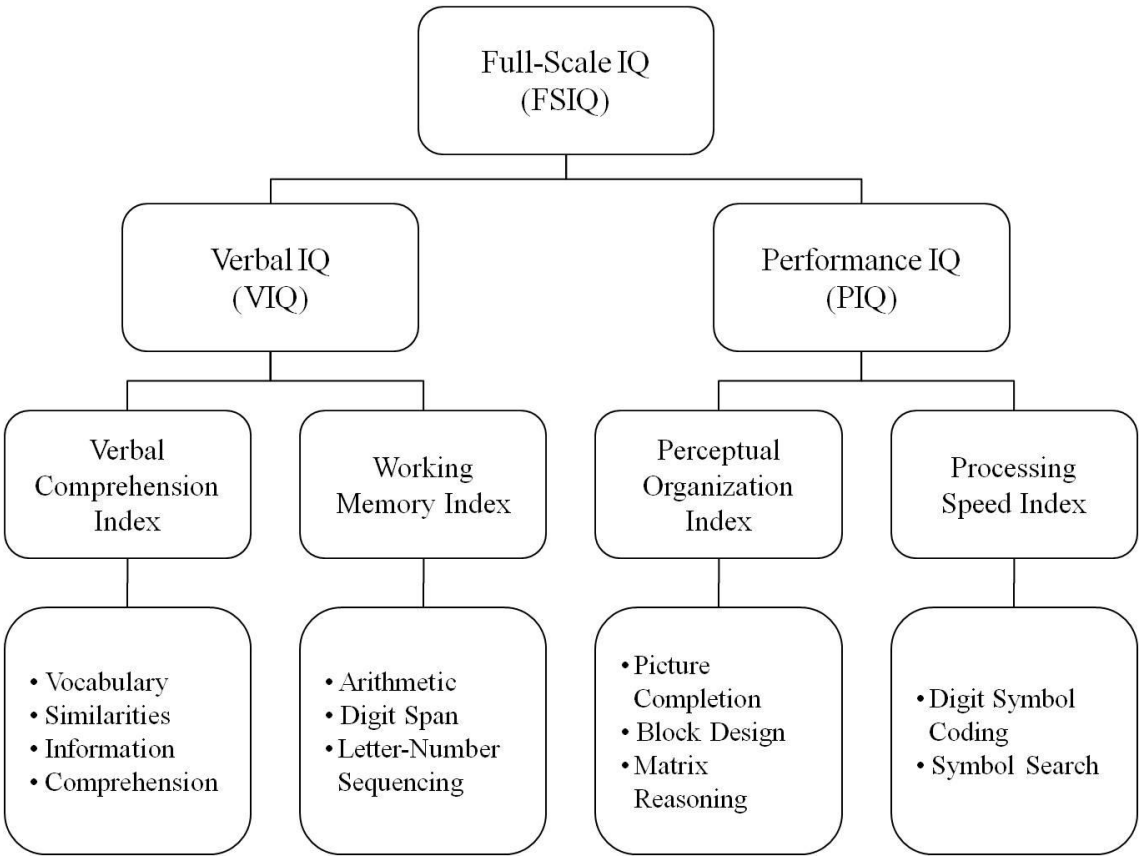
The Perceptual organization index includes:

- Block Design
- Matrix Reasoning
- Picture Completion

The Processing speed index includes:

- Digit Symbol-Coding
- Symbol Search

Graphic illustration below:



B. Accompanying Tables

Table A1. Distribution of Beauty-Hungry Occupations

Occupation	Full Sample
Beauty-Hungry	64.6%
	(347)
Professional/Managerial	23.6%
	(127)
Clerical	26.8%
	(144)
Service	14.2%
	(76)
Beauty-Indifferent	35.4%
	(190)
Manual	21.2%
	(114)
Craft	14.2%
	(76)

Note: This table shows the distribution of 'beauty-hungry' occupations. Absolute numbers are in parentheses.

Table A2. Gender-Specific Regressions without Intelligence

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Education	.093*** (.0072)	.091*** (.0065)	.092*** (.0071)	.091*** (.0065)	.090*** (.0076)	.091*** (.006)
Experience	.052*** (.0061)	.051*** (.006)	.054*** (.0056)	.052*** (.0057)	.051*** (.0056)	.053*** (.0058)
Experience^2	.0008*** (.000085)	.0009*** (.000094)	.0009*** (.000096)	.0009*** (.000082)	.0008*** (.00008)	.0008*** (.000075)
Beauty	.063** (.028)	.059** (.026)	.068** (.031)	.068*** (.017)	.063** (.027)	.076*** (.02)
Intelligence	–	–	–	–	–	–
Mills (Spousal wage)	1.33*** (.06)	–	–	1.09*** (.049)	–	–
Mills (# of children)	–	1.12*** (.074)	–	–	1.27*** (.085)	–
Mills (both)	–	–	1.39*** (.077)	–	–	1.33*** (.074)
Intercept	2.12*** (.18)	2.64*** (.20)	2.55*** (.18)	2.04*** (.17)	2.29*** (.16)	2.83*** (.22)
Control for Selection	Yes	Yes	Yes	Yes	Yes	Yes
Observations	273	273	273	264	264	264

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A3.

Table A3. First Stage Estimation – Gender-Specific Regressions without Intelligence

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Education	.016***	.018***	.015***	.026***	.023***	.021***
	(.0029)	(.0033)	(.0028)	(.0044)	(.0045)	(.0036)
Experience	.0084***	.0079***	.0081***	.0091***	.0087***	.0088***
	(.001)	(.00089)	(.00096)	(.001)	(.00097)	(.00091)
Experience^2	-.0519***	-.0589***	-.0639***	-.0298***	-.0219***	-.0296***
	(.0079)	(.0089)	(.0091)	(.0044)	(.0031)	(.0046)
Beauty	.0007***	.0008***	.0008***	.0007***	.0008***	.0008***
	(.000086)	(.000085)	(.000097)	(.000077)	(.000085)	(.000081)
Intelligence	–	–	–	–	–	–
Spousal wage	.52***	–	.34***	.31***	–	.37***
	(.087)		(.053)	(.05)		(.064)
# of children	–	.42***	.39***	–	.41***	.31***
		(.028)	(.031)		(.027)	(.022)
Intercept	-2.19***	-2.66***	-2.62***	-2.22***	-2.47***	-2.19***
	(.17)	(.21)	(.22)	(.17)	(.19)	(.16)
	Wald chi2(8) = 194.48 Prob > chi2 = 0.0000	Wald chi2(8) = 168.26 Prob > chi2 = 0.0000	Wald chi2(8) = 194.32 Prob > chi2 = 0.0000	Wald chi2(8) = 181.18 Prob > chi2 = 0.0000	Wald chi2(8) = 196.86 Prob > chi2 = 0.0000	Wald chi2(8) = 191.873 Prob > chi2 = 0.0000
Observations	298	298	298	278	278	278
Censored	41	41	41	23	23	23
Uncensored	257	257	257	255	255	255

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A4. Gender-Specific Regressions with Intelligence

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Education	.051*** (.0098)	.052*** (.01)	.051*** (.0093)	.053*** (.0089)	.052*** (.0087)	.053*** (.0083)
Experience	.032*** (.004)	.031*** (.0038)	.033*** (.0039)	.034*** (.0045)	.035*** (.0044)	.035*** (.00041)
Experience^2	.0006*** (.00009)	.0005*** (.000071)	.0006*** (.000098)	.0007*** (.000086)	.0008*** (.00012)	.0005*** (.000077)
Beauty	.011* (.0092)	.009* (.0069)	.012** (.0075)	.015** (.0088)	.014** (.0082)	.018** (.01)
Intelligence	.273*** (.04)	.269*** (.038)	.276*** (.04)	.28*** (.037)	.276*** (.038)	.278*** (.035)
Mills (Spousal wage)	.311 (.89)	–	–	.499 (1.43)	–	–
Mills (# of children)	–	.186 (.58)	–	–	.101 (.29)	–
Mills (both)	–	–	.483 (1.56)	–	–	.372 (1.2)
Intercept	2.46*** (.19)	2.12*** (.18)	2.83*** (.22)	2.35*** (.18)	2.08*** (.19)	2.41*** (.16)
Control for Selection	Yes	Yes	Yes	Yes	Yes	Yes
Observations	273	273	273	264	264	264

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A5.

Table A5. First Stage Estimation – Gender-Specific Regressions with Intelligence

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Education	.0059***	.0051***	.0055***	.0063***	.0065***	.0071***
	(.0012)	(.00085)	(.00093)	(.0013)	(.0011)	(.0012)
Experience	.0062***	.0058***	.0069***	.0069***	.0066***	.0061***
	(.00078)	(.00083)	(.00093)	(.00086)	(.00073)	(.00068)
Experience^2	-.0487***	-.0576**	-.0603***	-.0323***	-.0294**	-.0398***
	(.0075)	(.0096)	(.01)	(.0049)	(.0042)	(.0074)
Beauty	.0004***	.0003***	.0007***	.0006***	.0006***	.0007***
	(.00005)	(.000033)	(.000083)	(.000075)	(.000067)	(.0001)
Intelligence	.46***	.41***	.39***	.44***	.40***	.45***
	(.068)	(.055)	(.065)	(.063)	(.0625)	(.05)
Spousal wage	.48***	–	.39***	.41***	–	.33***
	(.08)		(.065)	(.082)		(.066)
# of children	–	.33***	.36***	–	.38***	.37***
		(.022)	(.024)		(.025)	(.034)
Intercept	-2.88***	-2.98***	-2.79***	-2.42***	-2.49***	-2.83***
	(.22)	(.23)	(.25)	(.19)	(.19)	(.24)
	Wald chi2(8) = 179.13 Prob > chi2 = 0.0000	Wald chi2(8) = 155.61 Prob > chi2 = 0.0000	Wald chi2(8) = 181.41 Prob > chi2 = 0.0000	Wald chi2(8) = 169.37 Prob > chi2 = 0.0000	Wald chi2(8) = 156.72 Prob > chi2 = 0.0000	Wald chi2(8) = 175.80 Prob > chi2 = 0.0000
Observations	298	298	298	278	278	278
Censored	41	41	41	23	23	23
Uncensored	257	257	257	255	255	255

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A6. Occupational Sorting by Tenure Groups

	Tenure < 2 years			Tenure 2 - 5 years			Tenure > 5 years		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education	.028**	.024**	.029**	.021*	.019*	.022*	.014*	.013*	.016*
	(.013)	(.012)	(.015)	(.016)	(.014)	(.016)	(.013)	(.0093)	(.011)
Experience	.031*	.030*	.032*	.025*	.022*	.024*	.009*	.008*	.012*
	(.026)	(.025)	(.024)	(.02)	(.0176)	(.017)	(.0075)	(.0067)	(.011)
Experience^2	.00011	.0002	.00013	.00014	.00013	.00016	.00009	.00008	.00011
	(.00031)	(.00057)	(.00037)	(.00044)	(.0004)	(.00046)	(.00026)	(.00025)	(.00028)
Beauty	.009	.007	.01	.008	.005	.008	.006	.004	.005
	(.081)	(.05)	(.056)	(.047)	(.029)	(.038)	(.029)	(.017)	(.022)
Beauty-Hungry Occ.	.09	.04	.07	.05	.06	.04	.009	.02	.01
	(.75)	(.36)	(.46)	(.35)	(.05)	(.31)	(.056)	(.11)	(.059)
Interaction Term (Beauty – Beauty-Hungry Occ)	-.03	-.04	-.02	-.05	-.05	-.04	-.07	-.03	-.04
	(.086)	(.11)	(.0625)	(.17)	(.143)	(.137)	(.219)	(.097)	(.129)
Intelligence	.269***	.261***	.264***	.281***	.275***	.283***	.301***	.294***	.31***
	(.039)	(.038)	(.038)	(.04)	(.036)	(.037)	(.042)	(.045)	(.044)
Mills (spousal wage)	.501	–	–	.625	–	–	.581	–	–
	(1.43)			(1.84)			(1.66)		
Mills (# of children)	–	.111	–	–	.189	–	–	.129	–
		(.33)			(.54)			(.37)	
Mills (both)	–	–	.409	–	–	.497	–	–	.474
			(1.28)			(1.46)			(1.35)
Intercept	3.2***	3.1***	3.6***	3.4***	3.9***	3.1***	3.3***	3.5***	3.2***
	(.25)	(.24)	(.28)	(.26)	(.30)	(.18)	(.21)	(.19)	(.24)
Control for Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	189	189	189	171	171	171	177	177	177

Notes: (i) The dependent variable is ln(wage).
(ii)Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A7.

Table A7. First Stage Estimation – Occupational Sorting by Tenure Groups

	Tenure < 2 years			Tenure 2 - 5 years			Tenure > 5 years		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education	.0042***	.0038***	.0045***	.0031***	.0029***	.0022***	.0029***	.0022***	.0019***
	(.00081)	(.00069)	(.00076)	(.00056)	(.00058)	(.00041)	(.00056)	(.00044)	(.00032)
Experience	.0063***	.0056***	.0059***	.0052***	.0049***	.0043***	.0041***	.004***	.0041***
	(.00079)	(.00069)	(.00074)	(.00065)	(.00058)	(.00054)	(.00051)	(.00053)	(.00055)
Experience^2	-.0257***	-.0309**	-.0174***	-.0124***	-.0287**	-.0153***	-.0121***	-.0222**	-.0154***
	(.0039)	(.0045)	(.0025)	(.0019)	(.0048)	(.0028)	(.0019)	(.0032)	(.0026)
Beauty	.0006***	.0006***	.0007***	.0004***	.0004***	.0005***	.0003***	.0002***	.0001***
	(.000075)	(.000067)	(.000082)	(.00005)	(.000044)	(.000068)	(.000038)	(.000029)	(.000011)
Beauty-Hungry Occ.	.009***	.011***	.013***	.006***	.004***	.004***	.005***	.004***	.006***
	(.0015)	(.0014)	(.0018)	(.00086)	(.00057)	(.00056)	(.0013)	(.001)	(.0015)
Interaction Term (Beauty – Beauty-Hungry Occ)	-.16***	-.19***	-.13***	-.21***	-.20***	-.19***	-.19***	-.22***	-.17***
	(.015)	(.012)	(.0125)	(.0525)	(.05)	(.049)	(.038)	(.05)	(.029)
Intelligence	.34***	.38***	.38***	.36***	.39***	.42***	.40**	.41***	.44***
	(.05)	(.054)	(.048)	(.05)	(.06)	(.053)	(.057)	(.051)	(.059)
Spousal wage	.24***	–	.20***	.27***	–	.21***	.29***	–	.18***
	(.04)		(.025)	(.039)		(.035)	(.058)		(.036)
# of children	–	.28***	.21***	–	.31***	.19***	–	.29***	.18***
		(.019)	(.014)		(.02)	(.013)		(.019)	(.014)
Intercept	-1.74***	-1.66***	-1.52***	-1.87***	-1.72***	-1.32***	-1.99***	-1.76***	-1.71***
	(.13)	(.14)	(.013)	(.14)	(.16)	(.010)	(.15)	(.18)	(.015)
	Wald chi2(8) = 179.24 Prob > chi2 = 0.0000	Wald chi2(8) = 174.29 Prob > chi2 = 0.0000	Wald chi2(8) = 182.63 Prob > chi2 = 0.0000	Wald chi2(8) = 186.18 Prob > chi2 = 0.0000	Wald chi2(8) = 173.99 Prob > chi2 = 0.0000	Wald chi2(8) = 192.01 Prob > chi2 = 0.0000	Wald chi2(8) = 189.73 Prob > chi2 = 0.0000	Wald chi2(8) = 183.72 Prob > chi2 = 0.0000	Wald chi2(8) = 195.92 Prob > chi2 = 0.0000
Observations	189	189	189	171	171	171	177	177	177
Censored	4	4	4	14	14	14	7	7	7
Uncensored	185	185	185	157	157	157	170	170	170

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A8. Restricted Sample (18–35 year olds)

	(1)	(2)	(3)
Education	.056*** (.01)	.055*** (.0092)	.057*** (.0097)
Experience	.042*** (.0053)	.039*** (.0049)	.041*** (.0048)
Experience^2	.0008*** (.0001)	.0009*** (.000125)	.0006*** (.000086)
Beauty	.02** (.011)	.015** (.0086)	.020** (.011)
Intelligence	.281*** (.056)	.279*** (.039)	.286*** (.042)
Mills (spousal wage)	.741 (2.12)	–	–
Mills (# of children)	–	.329 (1.03)	–
Mills (both)	–	–	.587 (1.68)
Intercept	3.49*** (.27)	3.12*** (.28)	3.78*** (.34)
Control for Selection	Yes	Yes	Yes
Observations	272	272	272

Notes: (i) The dependent variable is ln(wage).
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.
(vii) First stage estimation may be found in Table A9.

Table A9. First Stage Estimation – Restricted Sample (18–35 year olds)

	(1)	(2)	(3)
Education	.0022***	.0019***	.0025***
	(.00038)	(.00032)	(.00042)
Experience	.0081***	.0092***	.0079***
	(.001)	(.001)	(.001)
Experience^2	-.0124***	-.0203**	-.0291***
	(.0019)	(.0029)	(.0045)
Beauty	.0009***	.0005***	.0009***
	(.00011)	(.000062)	(.00012)
Intelligence	.34***	.32***	.29***
	(.049)	(.047)	(.038)
Spousal wage	.32***	–	.22***
	(.054)		(.037)
# of children	–	.29***	.31***
		(.019)	(.022)
Intercept	-2.11***	-2.42***	-2.85***
	(.16)	(.22)	(.24)
	Wald chi2(8) = 156.11 Prob > chi2 = 0.0000	Wald chi2(8) = 143.23 Prob > chi2 = 0.0000	Wald chi2(8) = 166.32 Prob > chi2 = 0.0000
Observations	272	272	272
Censored	16	16	16
Uncensored	256	256	256

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A10. First Stage Estimation – Entire Sample

	(1)	(2)	(3)	(4)	(5)	(6)
Education	.012*** (.0023)	.018*** (.0035)	.021*** (.004)	.0057*** (.0011)	.0061*** (.0012)	.0061*** (.0013)
Experience	.0098*** (.0012)	.01*** (.0013)	.0087*** (.0014)	.0078*** (.000095)	.0014*** (.00018)	.0011*** (.00014)
Experience^2	-.0443*** (.0068)	-.025*** (.0038)	-.0395*** (.0064)	-.0565*** (.0094)	-.0387** (.0065)	-.0221*** (.0035)
Beauty	.0008*** (.0001)	.001*** (.00013)	.0009*** (.00011)	.0001*** (.000014)	.0003*** (.00004)	.0001*** (.000016)
Intelligence	–	–	–	.48*** (.07)	.49*** (.08)	.45*** (.06)
Spousal wage	.59*** (.10)	–	.43*** (.074)	.24*** (.04)	–	.23*** (.039)
# of children	–	.37*** (.025)	.45*** (.03)	–	.21*** (.019)	.28*** (.0253)
Intercept	-2.37*** (.18)	-2.95*** (.23)	-1.75*** (.16)	-2.42*** (.21)	-2.62*** (.20)	-2.01*** (.18)
	Wald chi2(8) = 199.10 Prob > chi2 = 0.0000	Wald chi2(8) = 179.98 Prob > chi2 = 0.0000	Wald chi2(8) = 201.77 Prob > chi2 = 0.0000	Wald chi2(8) = 206.24 Prob > chi2 = 0.0000	Wald chi2(8) = 188.56 Prob > chi2 = 0.0000	Wald chi2(8) = 209.79 Prob > chi2 = 0.0000
Observations	576	576	576	576	576	576
Censored	64	64	64	64	64	64
Uncensored	512	512	512	512	512	512

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A11. First Stage Estimation – Occupational Sorting

	(1)	(2)	(3)
Education	.0012***	.0016***	.0013***
	(.00023)	(.00031)	(.00024)
Experience	.0031***	.0021***	.0019***
	(.00039)	(.00026)	(.00022)
Experience^2	-.0131***	-.0101**	-.0199***
	(.002)	(.0014)	(.0028)
Beauty	.0003***	.0002***	.0003***
	(.000038)	(.000025)	(.000035)
Beauty-Hungry Occ.	.03***	.009***	.011***
	(.005)	(.0015)	(.0017)
Interaction Term (Beauty – Beauty-Hungry Occ.)	-.12***	-.18***	-.15***
	(.022)	(.033)	(.025)
Intelligence	.21***	.25***	.26***
	(.026)	(.027)	(.038)
Spousal wage	.31***	–	.19***
	(.053)		(.031)
# of children	–	.28***	.20***
		(.019)	(.013)
Intercept	-2.88***	-2.23***	-1.79***
	(.22)	(.17)	(.14)
	Wald chi2(8) = 213.13 Prob > chi2 = 0.0000	Wald chi2(8) = 202.31 Prob > chi2 = 0.0000	Wald chi2(8) = 218.47 Prob > chi2 = 0.0000
Observations	576	576	576
Censored	64	64	64
Uncensored	512	512	512

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

Table A12. First Stage Estimation – Tenure-Specific Regressions

	Tenure < 2 years			Tenure 2 - 5 years			Tenure > 5 years		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education	.0071***	.0064***	.0063***	.0062***	.0056***	.0051***	.0064***	.0068***	.0062***
	(.0014)	(.0018)	(.0012)	(.0013)	(.0011)	(.001)	(.0012)	(.0014)	(.001)
Experience	.00082***	.00095***	.00099***	.00074***	.00052***	.00044***	.00084***	.00076***	.00089***
	(.00011)	(.00012)	(.00012)	(.000087)	(.000065)	(.000055)	(.00011)	(.0001)	(.00013)
Experience^2	-.0661***	-.0532**	-.0487***	-.0098***	-.0099**	-.0083***	-.0093***	-.0066**	-.0085***
	(.01)	(.0088)	(.0081)	(.0016)	(.0019)	(.0014)	(.0014)	(.001)	(.0013)
Beauty	.0006***	.0005***	.0003***	.0003***	.00029***	.00038***	.0002***	.0004***	.00037***
	(.000086)	(.00007)	(.000043)	(.000042)	(.000045)	(.000058)	(.00029)	(.000056)	(.000047)
Intelligence	.43***	.41***	.44***	.45***	.41***	.43***	.44***	.42***	.42***
	(.063)	(.058)	(.063)	(.064)	(.067)	(.079)	(.073)	(.069)	(.074)
Spousal wage	.38***	–	.25***	.31***	–	.29***	.33***	–	.27***
	(.066)		(.041)	(.063)		(.053)	(.067)		(.047)
# of children	–	.21***	.29***	–	.26***	.22***	–	.27***	.26***
		(.019)	(.032)		(.014)	(.015)		(.025)	(.019)
Intercept	-1.46***	-2.62***	-2.33***	-1.98***	-2.47***	-2.08***	-2.54***	-2.31***	-2.87***
	(.12)	(.20)	(.17)	(.22)	(.29)	(.19)	(.23)	(.27)	(.26)
	Wald chi2(8) = 203.51 Prob > chi2 = 0.0000	Wald chi2(8) = 202.48 Prob > chi2 = 0.0000	Wald chi2(8) = 211.81 Prob > chi2 = 0.0000	Wald chi2(8) = 189.26 Prob > chi2 = 0.0000	Wald chi2(8) = 184.93 Prob > chi2 = 0.0000	Wald chi2(8) = 204.59 Prob > chi2 = 0.0000	Wald chi2(8) = 189.99 Prob > chi2 = 0.0000	Wald chi2(8) = 186.43 Prob > chi2 = 0.0000	Wald chi2(8) = 195.86 Prob > chi2 = 0.0000
Observations	189	189	189	171	171	171	177	177	177
Censored	4	4	4	14	14	14	7	7	7
Uncensored	185	185	185	157	157	157	170	170	170

Notes: (i) The dependent variable of the first stage estimation is whether an individual works and reports wage.
(ii) Robust standard errors are in parentheses.
(iii) The beauty measure has been normalized to have a standard deviation equal to one.
(iv) The intelligence measure has been normalized to have a standard deviation equal to one.
(v) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(vi) Other variables that are controlled for are race, gender, nationality, health status, marital status, number of siblings, parental education and parental health. None of them are statistically significant.

PAPER 3

ATTRACTIVE COMPENSATION, OR COMPENSATION FOR BEING ATTRACTIVE? EVIDENCE FROM GERMAN CEOS

ABSTRACT

The present study examines the impact of physical attractiveness on the determination of executive compensation in a sample of 450 publicly traded companies in Germany. Results show that physically attractive CEOs experience a sizeable compensation premium in the form of higher total compensation: a one standard deviation increase in the utilized measure of physical attractiveness increases a CEO's total compensation by 9%. This premium, however, ultimately decreases to zero, the greater the length of prior work experience and tenure in the CEO position. The 'beauty premium' may serve as a signal of job performance early in one's career and job tenure, but weakens over time as true job performance becomes gradually observed.

1. Statement of the Problem

It is a well-established fact from labor market research that physical attractiveness can have a positive impact on one´s labor market outcome (e.g. Bowles et al., 2001; Hamermesh and Biddle, 1994; Harper, 2000; French, 2002; Fletcher, 2009). Hamermesh and Biddle (1994) have shown a significant premium to physical attractiveness, the so-called 'beauty premium', in that people who are assessed as attractive earn more than those deemed unattractive. In their study, Hamermesh and Biddle (1994) indicate that for United States and Canadian employees the expected hourly wage difference between men judged to be unattractive and those judged to be attractive is 14% of the expected wage, with the 'beauty premium' for women being around 9%. The authors also identified a wage penalty for plainness, approximately 11% for women and 15% for men, slightly higher than the 'beauty premium'. In later research, Harper (2000) used British longitudinal data drawn from the National Child Development Study to examine the effect of physical attractiveness of seven- and eleven-year olds on their labor market outcome after 26 and 22 years, respectively. Harper's results confirm a 'beauty premium' for both men and women, although the penalty for plainness is higher for men than it is for women. Further work on the 'beauty premium' was taken up by French (2002), who tested for wage differentials among employees based on their self-reported physical attractiveness. In contrast to the findings of Hamermesh and Biddle (1994) and Harper (2000), French found a 'beauty premium' for women, though not for men, while Fletcher (2009), using a dataset from the National Longitudinal Study of Adolescent Health, again showed a premium for both genders.

A different approach is taken by Andreoni and Petrie (2008), who conducted a repeated linear public goods game with voluntary contributions. They find that when only the total group contribution is observable in each round, more attractive subjects earn more and hence receive a 'beauty premium', even though they contribute, on average, no more or less than others to the public good. The 'beauty premium', however, disappears once all subjects know exactly what each group member contributed to the public good in the previous rounds. Andreoni and Petrie (2008) explain their findings as being due to expectations regarding how attractive people will behave, with attractive people expected to be more cooperative (p. 89).

According to Andreoni and Petrie (2008), although a repeated linear public goods game does not provide "a direct test of the beauty premium … in the labor market, a public goods game is nonetheless an interesting institution for exploring how such wage differences can emerge in an employment setting" (p.74). The authors thus interpret their findings as applicable to a real employment situation by extrapolating the results from their laboratory setting into the labor market field. In particular, when true productivity is unknown, people will tend to reward physical attractiveness as a signal of such productivity, whereas when true productivity is known, the 'beauty premium' disappears (p.89).

The present study follows the work of Hamermesh and Biddle (1994), but focuses specifically on German CEOs. The aim is to examine whether there exists a 'beauty premium' for CEOs. If, in line with the findings of Paper 2, beauty is found to be a signal for performance, then we might expect there to be less of a 'beauty premium' for CEOs than for rank-and-file employees since their performance can be observed very early on. This is because it is possible to benchmark the performance

of firms against the market or industry, and hence the CEOs' performance can be more easily monitored and publicly observed by the market. In this respect, CEOs represent an important target group for study.

Results of this study do show a 'beauty premium' that is reflected in total compensation. A one standard deviation increase in the utilized measure of physical attractiveness increases a CEO's total compensation by 9%. Three interpretations of this result are put forward: productivity-based, in which a CEO's physical attractiveness is a productive asset to the firm; signaling-based, in which physical attractiveness serves as a signal for intelligence or ability; and charm-based, in which a CEO's charisma can effectively influence the board of directors. The story best supported by the evidence of this paper is that of signaling, in which beauty is important both early in one's career and early in the CEO position, but its effect evaporates over time with longer prior work experience and longer tenure in the CEO position, as job-specific ability becomes gradually revealed.

The remainder of the paper is organized as follows. Section 2 provides information about the data. Section 3 outlines the estimated model and discusses the main results, with a focus on the effect of physical attractiveness. Section 4 concludes.

2. Data

For this research to be conducted, a dataset containing an exhaustive amount of information on CEOs and the corresponding companies is necessary. The identification strategy requires a dataset that contains information on the CEOs' physical attractiveness as well as on the usual labor market variables of interest for economists such as compensation, education, work experience, tenure in the company, tenure in the job, gender, nationality, race and age. Beyond that, a set of company characteristics, including firm size, firm performance, market capitalization and recent stock market returns, is needed in order to control for variables that are potentially relevant. For this, a unique dataset was collected from the field. In this regard, Germany represents a suitable country of investigation since the CEOs of all companies listed on the German stock exchange are required to publicize their compensation. Additionally, the CVs with all required information as well as a photograph are available on the companies´ websites.[24] In order to get an unbiased estimate of the impact of attractiveness, the CEOs' physical attractiveness was independently rated by 40 randomly chosen individuals[25] using a 5-point scale, which ranges from plain (1 point) to highly attractive (5 points).[26] The beauty measure has been normalized to have a standard deviation equal to one. An obvious concern is that the evaluators may recognize the individuals in the photos and therefore

[24] It is very likely that all companies engaged a professional photographer to take pictures of their CEOs. Those photos have to be of excellent quality as they are publicly available and are used for advertising. Nevertheless, there is heterogeneity in the quality of the photos, which may lead to a measurement error. This measurement error may lower the efficiency of the estimates.

[25] Of these 40 evaluators, 15 were women and 25 were men. The evaluators were all between 30 and 50 years old.

[26] Sample photos can be found in Appendix C.

are biased in their judgement. For this, a control group of 25 Austrians[27], who are likely not to recognize the CEOs, rated each photo in terms of their physical attractiveness using the same 5-point scale.[28] Overall, no significant difference for the physical attractiveness ratings of either group was found. The difference in mean rating between the German raters and the Austrian raters was statistically insignificant at a 5% level in 94% of the 450 photos. The average inter-rater correlation coefficient of 0.373 is comparable to Biddle and Hamermesh (1998). Cronbach's alpha for the ratings by a 40-person panel is 0.82, which indicates that there is strong inter-rater agreement on the attractiveness of the photographed individuals (see Zebrowitz et al., 1993).

The dataset includes demographic characteristics on 450 CEOs of the largest firms in Germany as measured by market capitalization and sales, and detailed data on the corresponding company in 2009. Table A1 (in the Appendix) summarizes the main variables along with their basic characteristics.

The dependent variable, CEO compensation, was assessed using both CEO cash compensation and CEO total compensation. CEO cash compensation is the sum of salary plus annual bonuses, consistent with the vast majority of studies on CEO compensation (e.g. Finkelstein and Hambrick, 1989; Gerhart and Mickovich, 1990; Rajagopalan and Finkelstein, 1992). Total CEO compensation consists of cash compensation plus the market value of options, restricted and unrestricted stock awards, which is consistent with previous studies using total CEO compensation (e.g. Jensen and Murphy, 1990; Hambrick and Finkelstein, 1995; Henderson and Frederickson, 1996).

[27] Of these 25 evaluators, 9 were women and 16 were men. The evaluators were all between 30 and 50 years old.
[28] The ratings of both groups are available from the author upon request.

When investigating the impact of physical attractiveness and executive compensation, various other variables which might affect CEO compensation need to be controlled for. To measure firm performance, two different approaches were adopted: a market-based measure and an accounting-based measure. Both performance measures were examined separately, since they do not always converge to represent the same construct of firm performance (Fryxell and Barton, 1990).

The accounting-based measure is defined as the return on assets (McGahan and Porter, 1997). The market-based measure, however, is defined as shareholder return and is measured as:

$$[(SCP_{(t)} - SCP_{(t-1)}) + DPS_{(t)}] / SCP_{(t-1)}$$

where $SCP_{(t)}$ is the year-end share closing price for the year *t*, $SCP_{(t-1)}$ is the year-end share closing price for the year *t-1*, and $DPS_{(t)}$ is the annual dividends paid per share in the year *t* (e.g. Murphy, 1985; Jensen and Murphy, 1990). Returns on assets and stock market returns from 2008 were utilized for the empirical analysis, as CEO compensation packages are typically affected by firm performance in the previous but not the current year.

Following previous research (Tosi et al., 2000), the firm size is measured using a principal components analysis performed on the natural logarithm of the number of employees and the natural logarithm of firm sales.

3. Methodology and Results

3.1 Baseline Results

Estimates of the effect of physical attractiveness on executive compensation can be arrived at using different strategies. The present empirical model follows recent literature on wage determination, particularly research examining the 'beauty premium' by using the 'earnings function' (e.g. Harper, 2000; French, 2002; Fletcher, 2009). The 'earnings function' method is only one approach to capture the effect of physical attractiveness, but has the advantage that it is easy to interpret and to gauge statistical significance of the coefficients.

The 'earnings function' method is attributed to Mincer (1974) and involves the fitting of a semi-log ordinary least squares regression using the natural logarithm of earnings as the dependent variable and years of schooling and potential years of labor market experience and its square as independent variables. With the purpose of testing the hypothesis, namely how much the 'beauty premium' matters for CEOs, the standard form of Mincer´s (1974) 'earnings function' needs to be modified by adding the beauty factor (physical attractiveness) and a set of other individual and company-specific characteristics to the model, to make out to what extent physical attractiveness affects executive compensation:

$$log(comp_{i,t}) = \alpha + \beta_1(educ_{i,t}) + \beta_2(exp_{i,t}) + \beta_3(beauty_{i,t}) + \gamma' (per\ char_{i,t}) + \delta' (com\ char_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

where index *i* denotes CEOs and the corresponding firms, *educ* captures years of education, *exp* the accumulated labor market experience, and *beauty* denotes the measure for the physical attractiveness of CEOs that has been normalized to have a

standard deviation equal to one. *per char*$_i$ is a vector of personal characteristics, such as tenure in the company, tenure in the job, race, nationality, and a dummy for doctoral degree and university ranking, which might affect the compensation level. So as to lower the residual variance of the regression and perhaps reduce omitted variable bias, company characteristics are also added to the regression. *com char*$_i$ is a vector capturing company specifics, such as firm size, size of the previous firm, firm performance, market capitalization or recent stock market returns. α is the level of non-qualified wage, β_3 may be interpreted as the rate of return to physical attractiveness, and ε_t a mean zero residual. Likewise, β_1, β_2, γ' and δ' are those effects that correspond to the return to the other variables. The results of estimating (1) by OLS are shown in Table 1.

Table 1. Impact of Physical Attractiveness on Executive Compensation

	Log Cash Compensation		Log Total Compensation	
	(1)	(2)	(3)	(4)
Education	.084	.082	.092	.083
	(.13)	(.17)	(.14)	(.16)
Experience	.021**	.021**	.019**	.02**
	(.009)	(.0085)	(.008)	(.008)
Beauty	.04	.03	.09**	.09**
	(.06)	(.07)	(.036)	(.037)
Market Capitalization	.36***	.36***	.36***	.36***
	(.02)	(.03)	(.03)	(.03)
Firm Size	.11*	.12*	.11**	.11**
	(.068)	(.07)	(.05)	(.052)
Shareholder Return$_{2008}$	.04	–	.02	–
	(.08)		(.09)	
Return on Assets$_{2008}$	–	.15*	–	.16*
		(.09)		(.09)
Intercept	5.3***	5.1***	5.9***	5.8***
	(.49)	(.48)	(.52)	(.49)
Observations	450	450	450	450

Notes: (i) Robust standard errors are in parentheses.
(ii) The beauty measure has been normalized to have a standard deviation equal to one.
(iii) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(iv) Other variables that are controlled for are tenure in the company, tenure in the job, gender, age, race, nationality, doctoral degree and university ranking and size of the previous firm. None of them are statistically significant.

As can be seen from Columns (1) and (2), CEO physical attractiveness appears to be unrelated to cash compensation, but physically attractive CEOs earn more total compensation than do less attractive CEOs (Columns (3) and (4)). The attribute of physical attractiveness seems to be highly significant and highly valued in the labor market. The coefficient on physical attractiveness is 0.09, meaning that, ceteris paribus, a one standard deviation increase in the utilized measure of physical attractiveness will raise the level of compensation by 9%. The 'beauty premium' thus seems to be an important factor in determining CEOs' total compensation.[29]

In regards to other coefficient estimates, not all of them are statistically significant. Education, for instance, seems to be highly insignificant in the determination of compensation of CEOs. This could be explained by the fact that all CEOs in the sample have nearly the same level of education and thus there is little variation in years of education, which makes it difficult to identify the returns to education.

[29] The results of equation (1), excluding the controls for firm size and firm performance, show that the beauty effect is again unrelated to cash compensation, but there is a positive and significant coefficient on beauty related to total compensation. The 'beauty premium', however, is slightly smaller (0.07** (0.0175)) than in the original equation.

3.2 Possible Explanations

There are at least three potential explanations for the results described in subsection 3.1.

(1) Productivity-based. This theory posits that a CEO's level of physical attractiveness is a productive factor for the firm. An improvement in firm productivity could arise because certain customers may prefer to deal with better-looking CEOs, or better-looking CEOs may be more likely to generate media attention for the company.

(2) Signaling-based. The CEO's physical attractiveness may serve as a signal for his intelligence or ability, which benefits the company, as was discussed in Paper 2. Boards of directors may infer that attractive CEOs do better than others and therefore are willing to reward them with higher total compensation packages. This might come from the fact that exact information about CEOs' managerial abilities per se is unobservable to the boards of directors at the time managers are hired, which is why inferences are drawn about the CEOs' capabilities based on their physical attractiveness.

We would expect this explanation to work for new CEOs, who may be assumed to have less prior work experience or a shorter tenure in the CEO job, but not for CEOs with longer experience or tenure in the job. Presumably the market can more precisely observe the true productivity of a CEO the greater the amount of the CEO's prior work experience and the greater the length of tenure in the CEO position. Physical attractiveness then becomes less useful as a signal of job performance, and the 'beauty premium' would be expected to dissipate.

(3) Charm-based. A better-looking CEO is more successful in affecting boards of directors in ways that would lead to higher total compensation (Tosi and Gomez-Mejia, 1989).

As to explanation (1), we would expect that the 'beauty premium' would disappear once firm performance is controlled for.[30] But even after controlling for firm performance, physical attractiveness is shown to still matter (see Table 1). Yet evidence that insertion of a measure of firm performance in the regression does not affect the beauty coefficient might not convincingly eliminate the productivity hypothesis. For this reason the regression has been modified by taking the average firm performance measure over several years, namely all years in which the current CEO was in charge, after norming the annual firm performance measure by the average performance within the appropriate industry. I then use the multi-year firm performance measure as a dependent variable in the regression. The modification of the firm performance measure revealed no qualitative differences (see Table A3 in the Appendix).

[30] Using both return on assets and shareholder returns.

The signaling-based explanation claims that the presence of a positive and significant effect of physical attractiveness might be driven by signaling, where physical attractiveness serves as an informative signal about intelligence and performance. In this case, we would expect that the greater the amount of work experience prior to employment as a CEO, and the greater the length of tenure in the CEO position, the more precisely the market can observe true productivity of a CEO and hence the less useful attractiveness becomes as a signal of job performance. In other words, the 'beauty premium' should disappear with longer work experience and job tenure. To test this hypothesis, the sample is split into nine separate subsamples by two variables, job tenure and prior work experience. Job tenure is divided into three categories: low-tenure (less than 3 years); mid-tenure (3 – 6 years); and high-tenure (more than 6 years). Prior work experience is also divided into three categories: less than or equal to 15 years; 16 – 25 years; and more than 25 years. Table 2 displays the coefficients and standard errors for the estimate of the 'beauty premium' for each of the 9 subsamples, while still controlling for the same set of variables as in (1).[31]

[31] Complete results are available from the author upon request.

Table 2. The Impact of Physical Attractiveness on Compensation by Prior Work Experience and Tenure on the Job

Work experience before entering the CEO position	Tenure < 3 years		Tenure 3 – 6 years		Tenure > 6 years		Chow Test	Obs.
	Log Cash Compensation (1)	Log Total Compensation (2)	Log Cash Compensation (3)	Log Total Compensation (4)	Log Cash Compensation (5)	Log Total Compensation (6)		
exp ≤ 15 years	.11* (.062) [44]	.12** (.05) [44]	.022 (.057) [42]	.042* (.024) [42]	.001 (.02) [46]	.009* (.005) [46]	{< 3} > {3 - 6} > {> 6}	132
exp 16 – 25 years	.056 (.12) [24]	.061* (.035) [24]	.013 (.028) [54]	.026* (.015) [54]	-.006 (.027) [104]	.008 (.022) [104]	{< 3} > {3 - 6} > {> 6}	182
exp > 25 years	.023 (.10) [58]	.028 (.05) [58]	.009 (.0225) [42]	.011 (.02) [42]	-.04 (.21) [36]	-.05 (.24) [36]	{< 3} > {3 - 6} > {> 6}	136
Chow Test	{≤ 15} > {16 - 25} > {> 25}		{≤ 15} > {16 - 25} > {> 25}		{≤ 15} > {16 - 25} > {> 25}			
Obs.	126	126	138	138	186	186		

Notes: (i) Robust standard errors are in parentheses.
(ii) The beauty measure has been normalized to have a standard deviation equal to one.
(iii) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(iv) Work experience before entering the CEO position is defined as: exp = age – educ – 6 – tenure on the job.
(v) Numbers in brackets represent the number of observations for that group.
(vi) A regression of physical attractiveness on age reveals an insignificant coefficient. Physical attractiveness thus does not reflect age in Table 2.

The results indicate a decline of the 'beauty premium' both over the duration of job tenure and prior work experience[32], though there is a more dramatic decrease in the 'beauty premium' over the duration of tenure on the job than over prior work experience.[33] One explanation for this may be that uncertainty about general ability is smaller than about job-specific ability, since other factors such as educational attainment and the previous track record provide information about the CEO's general competence. Performance in the CEO position early on, however, is relatively uncertain, in which case the signaling effect of beauty may be more pronounced. While a strong 'beauty premium' exists for low-tenure and less work-experienced CEOs, no 'beauty premium' is observed for high-tenure and highly-experienced CEOs. A strong 'beauty premium' early in the career or early on the job would seem to substantiate the signaling-based theory, since stronger beauty-based inferences regarding ability are drawn about an inexperienced or a new CEO than about an experienced or a high-tenure CEO, as less is known about the true job performance of the former one. As true performance is gradually revealed, the 'beauty premium' declines to zero.

Another way to test the signaling-based explanation would be to run a single regression equation with interaction terms between the beauty measure and the

[32] I formally test for differences in the 'beauty premium' among age and tenure groups. For this I conduct a series of tests which examine whether the beauty coefficient estimated for one group is different from the beauty coefficient estimated for neighboring groups. There are nine groups in total subjected to these tests. For total compensation, the tests confirm that the beauty coefficients are significantly different from each other, meaning that the decline found in Table 2 is in fact present. For cash compensation, in some cases the difference is statistically significant, whereas in other cases the difference is not statistically significant.

[33] I tested whether the difference in beauty coefficients of the Tenure < 3 years and exp ≤ 15 years group, and the Tenure > 6 years and exp ≤ 15 years group, is statistically different from the difference in beauty coefficients of the Tenure < 3 years and exp ≤ 15 years group and the Tenure < 3 years and exp > 25 years group. The test confirms that the decrease across tenure is greater than the decrease over prior work experience.

experience / tenure dummies. The results are qualitatively unchanged.[34] The 'beauty premium' declines over job tenure and work experience.

The charm-based explanation would suggest a positive and significant coefficient in all cells of Table 2 even for high-tenure, highly-experienced CEOs. As the results in Table 2 show, the charm-based explanation is not supported by the data.

[34] Complete results are available from the author upon request.

3.3 Robustness Checks

One important issue with the measure of beauty is that it is ordinal rather than cardinal in nature. As a consequence, the presented results, which are based on a particular cardinal scale, may be sensitive to positive monotone transformations of this scale. I therefore examined the sensitivity of the presented results to several such transformations.

Three separate transformations were performed: a convex one, a concave one, and a step function. For the convex transformation, I take the exponential of the beauty measure, e^{beauty}, which is then normalized to have a standard deviation equal to one. For the concave transformation, I take the logarithm of the beauty measure, *log(beauty)*, which is again normalized to have a standard deviation equal to one. For the step function transformation, the data is split into two groups: one group comprised of those assigned 1 and 2 on the beauty measure, the other group comprised of those assigned 3, 4 and 5 on the beauty measure.

All regressions run with the original beauty measure are run again with these three transformations. Results for all regressions show there are no qualitative differences between the initial results and the results using the transformed measures.[35] Though the coefficients naturally are different, the sign and significance are nearly identical. These robustness checks thus alleviate concerns that the results are sensitive to a particular cardinalization of the ordinal beauty scale.

[35] Complete results are available from the author upon request.

3.4 Methodological Issues

In estimating wage differentials, it is of utmost importance to carefully consider potential problems, such as reverse causality or omitted variable bias. The failure to address these problems may cause biased estimates (e.g. Heckman, 1979; Semykina and Wooldridge, 2010). The presence of physical attractiveness as a determining factor of executive compensation, for example, raises the question whether the results might be driven by reverse causality, where higher wages lead to higher attractiveness. This might occur because top earners can more easily invest in their looks. This should not be a concern in the present study, however, because all the CEOs in the dataset are top earners, and hence all potentially have the opportunity to invest their incomes in this way.

As the findings could also suffer from an omitted variable bias, I isolate the effect of physical attractiveness on CEO compensation by controlling for as many other causes of variation in compensation as possible. To these control variables belong individual characteristics, including experience, tenure in the job and tenure in the company, as well as company characteristics, such as firm size, firm performance, market capitalization, and recent stock market returns.

Finally, there are two potential caveats that might result in possible measurement errors which need to be acknowledged. Although it is likely that all the CEOs' photos were professionally taken, and have to be as they are publicly available and used for media purposes, there is still unavoidable heterogeneity in the quality of the photos which may lead to a bias in the measurement of beauty. A second caveat is that raters may differ in their judgements of (un)attractiveness, which may lower the efficiency of the estimates. Work by Hatfield and Sprecher (1986), however, suggests that

assessments of attractiveness by raters tend to stay quite uniform, and change slowly over time.

4. Conclusion

The preceding analysis used the ‘earnings function’ method to examine if and how physical attractiveness is related to the level of executive compensation. Based on the field data used in the present study, there seems to exist a rather large and statistically significant ‘beauty premium’ even for the upper echelons of the business world, namely CEOs of the largest publicly traded companies in Germany. Such a finding is in line with the findings of Hamermesh and Biddle (1994).

This premium, however, is shown to decrease to zero, the greater the length of prior work experience and tenure in the CEO position. This decrease concurs with the application Andreoni and Petrie (2008) make of their own laboratory findings to real employment settings, in which they argue that although there is a significant premium to physical attractiveness, the ‘beauty premium’ disappears once information about the employee’s performance is known, and may even become a ‘beauty penalty’. The present study suggests that the ‘beauty premium’ dissipates over time not due to expected cooperativeness, but because beauty is a signal for ability and performance.

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6. Appendix

A. Summary of Main Variables

Table A1. Main Variables

	Obs.	Mean	Std. Dev.
Gender (1 stands for males)	450	0.99	0.07
Education	450	20.07	3.42
Experience	450	26.45	7.90
Tenure in the Company	450	13.11	9.58
Tenure in the Job	450	7.25	6.67
Cash Compensation (in mln Euros)	450	1.49	1.69
Total Compensation (in mln Euros)	450	2.47	1.80
Physical Attractiveness	450	2.73	0.52
Market Capitalization (in bln Euros)	450	4.41	10.4
Recent Stock Market Returns	450	0.78	2.96
Firm Size (Factor)	450	8.48	0.98
Shareholder Value	450	0.39	0.43
Return on Assets	450	0.24	0.23

B. Beauty-Hungry Industries

Table A2. Distribution of Beauty-Hungry Industries

Industry	Full Sample
Beauty-Hungry	61.8%
	(278)
Services	20.7%
	(93)
Public Administration	18.2%
	(82)
Finance, Insurance	15.8%
	(71)
Retail Trade	7.1%
	(32)
Beauty-Indifferent	38.2%
	(172)
Manufacturing	16.7%
	(75)
Wholesale Trade	10.4%
	(47)
Construction	6.9%
	(31)
Transportation, Communication	4.2%
	(19)

Note: This table shows the distribution of beauty-hungry industries, absolute numbers are in parentheses.

C. Modified Firm Performance Measure

Table A3. Impact of Physical Attractiveness on Executive Compensation

	Log Cash Compensation		Log Total Compensation	
	(1)	(2)	(3)	(4)
Education	.076	.074	.087	.081
	(.11)	(.12)	(.145)	(.20)
Experience	.019***	.020**	.02**	.02***
	(.0054)	(.009)	(.0086)	(.0048)
Beauty	.05	.03	.07**	.06**
	(.125)	(.075)	(.029)	(.027)
Market Capitalization	.34***	.33***	.31***	.34***
	(.024)	(.0275)	(.025)	(.028)
Firm Size	.10**	.10*	.09**	.11**
	(.045)	(.0625)	(.039)	(.048)
Shareholder $\text{Return}_{\text{Modified}}$	.07	–	.06	–
	(.175)		(.03)	
Return on $\text{Assets}_{\text{Modified}}$	–	.18*	–	.19*
		(.10)		(.11)
Intercept	4.7***	4.5***	5.9***	6.1***
	(.42)	(.49)	(.59)	(.508)
Observations	450	450	450	450

Notes: (i) Robust standard errors are in parentheses.
(ii) The beauty measure has been normalized to have a standard deviation equal to one.
(iii) ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.
(iv) Other variables that are controlled for are tenure in the company, tenure in the job, gender, age, race, nationality, doctoral degree and university ranking and size of the previous firm. None of them are statistically significant.

D. Sample questionnaire [8 out of 450 displayed]

Please take a few minutes and rate the following pictures according to the person´s physical attractiveness on a 5-point scale, which range from homely (1 point) to strikingly beautiful / handsome (5 points).

What is your gender?

☐ male
☐ female

	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)

	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)
	☐ 5-points (strikingly beautiful / handsome) ☐ 4-points (above average) ☐ 3-points (average) ☐ 2-points (below average) ☐ 1-point (homely)