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Do Looks Matter for an Academic Career in Economics?

Galina Hale*, Tali Regev†, and Yona Rubinstein‡

June 26, 2023

Abstract

This study explores the role of physical appearance in the success of economics PhD graduates and investigates the underlying mechanisms driving this relationship. Leveraging a unique data set of career and productivity trajectories from leading economics departments in the United States, we provide robust evidence that appearance is a predictive factor for both research productivity and job placement. Our analysis goes beyond mere confirmation of the association between beauty and success within the profession. By examining all three variables - appearance, job outcome, and productivity - as well as the longitudinal development of the later two over time, we offer novel insights into the ways in which physical attractiveness shapes success in the economics profession, extending beyond research related factors.

JEL classification: J71, J24, I23, M51, D91, A14

Key words: beauty, appearance, economists, statistical discrimination

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1 Introduction

Does appearance play a role in the hiring and promotion of university faculty? While hiring and promotion decisions in academia are focused on research productivity and ideally guided by ethical principles, there may be principal-agent motives that distort these decisions (Bandiera et al., 2007). It is not surprising that hiring committee decisions are closely monitored, and attention is given to ensuring equity and diversity in terms of gender, race and ethnicity. In this paper, we investigate whether PhD candidates' attractiveness predicts their success in securing more prestigious academic jobs, and whether this reflects statistical discrimination or the demand for and value of good-looking individuals in academia.

Appearance bias in the labor market has been widely documented in the literature. Attractive individuals generally land better jobs and make more money than plain-looking ones (Hamermesh, 2011). A key challenge is to separate between statistical and taste-based factors, since better looking individuals might be also more productive. Indeed, the literature has established that some aspects of individuals' performance may depend on their attractiveness. This is especially challenging in academia, where presentation and teaching are instrumental for success.

Here we present a novel strategy to distinguish between statistical and taste based discrimination, which is based on the idea that statistical discrimination should disappear as more information is accumulated about a candidate. We will ask whether attractiveness predicts success as measured by the rank of their department, and whether the predictive power of attractiveness diminishes when more information is accumulated about the researcher's productivity, as measured by the number of papers and citations. If attractiveness continues to predict job ranking even when more information is available, then attractiveness is valued beyond its role as a signal of research productivity. The academic profession is an ideal context for our analysis, as the profession routinely ranks departments and has well defined and readily available measures of researchers' productivity. Thus we extend the scope of previous studies examining the role of appearance in employment by utilizing measures of job quality, productivity effort and success over time that were not previously jointly available.

To explore the role of appearance in the academic labor market, we focus on economics depart-

ments. The field provides an ideal setting for our study due to several factors. Firstly, the cohorts graduating from each PhD institutions are typically large. Additionally, the job market for aspiring academic economists is highly structured, with candidates sending out their application packages for evaluation in time for interviews at the American Economics Association central conference. Furthermore, the economics academic profession is characterized by a significant degree of hierarchy, wherein economics departments are constantly ranked, and the productivity of researchers is extensively measured for the purposes of hiring and promotion. (Heckman and Moktan, 2020).

We constructed a data set of 752 individuals who earned their PhDs from ten of the leading economics departments in the US between 2002 and 2006. We follow these individuals from graduation until 2017 ("last observed job"). The data comprises information on the graduates' field of study, publication records, citations and job placements. We collected their photographs from their professional web sites in 2011, and obtained ratings of their physical attractiveness using 241 independent evaluators. We use departments' ranking taken from RePEc (2019) to measure job placement success, and citations and publications to measure research productivity. We utilize this data to study whether looks predicts job success during the first formative years in the candidates' careers, and the extent to which it reflects a signaling value of productivity or a taste for physical attractiveness.

We find that physical appearance plays a significant role in determining individuals' academic success, with beauty having a persistent impact on individual's careers. Consistent with previous research (Dilger et al., 2015; Fidrmuc and Paphawasit, 2018), we observe that attractiveness predicts research output.[1] More attractive economists are cited more overall and per publication. Next, we find that appearance also predicts job outcomes: we observe that women in top PhD programs are more attractive than men, indicating that attractive women may have a better chance of being selected into these elite programs. In terms of subsequent career outcomes, we observe that attractive individuals are more successful than those with a plain appearance. They are more likely to be placed in higher-ranking PhD institutions, and after graduation, they are more likely to find jobs in the private sector rather than academia or the public sector.[2] Within academia, attractive-

[1] We only focus on research productivity. Sen et al. (2010) find that teaching productivity is more affected by the "hotness" ratings from students than research productivity.

[2] While for many PhD economists private sector is not a preferred job outcome, this is consistent with the ap-

looking PhD graduates are also more likely to be placed at higher-ranking institutions for the first job, and appearance remains a significant factor in subsequent job rankings even after controlling for PhD and first job rankings.

All of these effects are robust to different samples and specifications, and are rather substantial in magnitude. Specifically, a one standard deviation increase in attractiveness score is associated with a 7-9 percentage point increase in the probability of achieving an above-median outcome in terms of job placement or citation count, depending on the outcome being considered.

Considering the predictive power of appearance for research output, it may be rational for employers to also value appearance for this signaling property. We present a model in which beauty is valued both for it's signaling value in predicting future productivity and because its esthetic and other non-research related value for employers. The model predicts that the signaling value of attractiveness should diminish as more information about true productivity is accumulated over time, and that the remaining effect of attractiveness can be attributed to the non-research related value of appearance for employers.

To assess whether beauty only plays a role as a signal for research productivity, or whether it reflects a taste for beauty, we measure whether the effect of beauty declines over time and with more information on individuals' research productivity. The coefficient on attractiveness in predicting the rank of last observed job is not significantly different than the one on first job. Publications and citations also predict the rank of last observed job, but including them in the regression, does not diminish the effect of beauty on the rank of last observed job. While research success predicts job success, it does not dilute the predictive power of attractiveness, which would have been the case if attractiveness only serves as a signal for research productivity. This suggests that looks matter for job outcomes above and beyond their effect on research success.

Why would appearance matter for the success of academic economists? Beauty matters in the labor market because good looks are appreciated by co-workers, bosses and customers (Biddle and Hamermesh, 1998; Babin et al., 2020). In addition, attractive individuals tend to receive more positive feedback and foster more positive interactions with others (Jackson et al., 1995; Langlois et

pearance premium in the private sector: at the margin, more attractive individuals face a better set of private sector offers and therefore are more likely to choose such jobs.

al., 2000), which can boost their confidence, charisma, and effectiveness in every task that requires human interaction (Thornton and Ryckman, 1991; Mobius and Rosenblat, 2006; Judge et al., 2009). Better-looking people are therefore more likely to be hired and, when hired, to get higher wages (Hamermesh and Biddle, 1994; Bóo et al., 2013). In academia, appearance may work in similar ways. Colleagues and students may demand good looks because they enjoy and value looks, because they believe the attractive person is a better scholar (Dion et al., 1972), or because the attractive person is actually a more effective teacher and scholar. A study of politicians by Berggren et al. (2010) found that perceived beauty is correlated with perceived competence and intelligence, suggesting an additional mechanism for the importance of appearance in academia. However, our study only found a small correlation between perceived attractiveness and perceived intelligence.[3]

While previous research has linked attractiveness to higher probability of obtaining jobs (Beam et al., 2020) and higher income (Hamermesh and Biddle, 1994; Langlois et al., 2000; Harper, 2000; Judge et al., 2009), there has been limited evidence on whether attractive individuals actually have higher productivity (Dilger et al., 2015; Fidrmuc and Paphawasit, 2018). Our study, using data on academic publications, moves beyond the apparent employer preference for attractiveness to demonstrate that attractiveness also predicts higher measurable outcomes in terms of publication success. The literature suggests that this effect could be due to a variety of mechanisms, such as attractive economists being invited to more conferences, presenting their work more convincingly, or because they are sought after as co-authors.[4] Our findings indicate that the higher productivity of attractive scholars partially explains why they are more likely to land good jobs, as the hiring committees may expect their future productivity to be high. However, we also demonstrate that looks matter for job quality above and beyond their impact on productivity.

Our analysis of the relationship between physical appearance, research productivity, and job outcomes in the economics profession is organized as follows. In Section 2, we introduce a model that highlights the role of physical attractiveness as a signal of future productivity, as well as having non-research-related value for employers. In Section 3, we describe our data set of career and pro-

[3]Since perceived intelligence in our analysis does not have much predictive power, we do not report these results and focus on attractiveness ratings only.

[4]Positive relationship between attractiveness and public speaking invitation and fees, at least for social sciences, is demonstrated in Bi et al. (2020).

ductivity trajectories of PhD graduates from leading economics departments in the United States. In Section 4, we examine the relationship between attractiveness and research output, as measured by citations. Section 5 explores the impact of physical attractiveness on job outcomes above and beyond its effect on research productivity. Finally, in Section 6, we conclude by emphasizing the multifaceted nature of physical appearance and its relevance to academic success, underscoring the need for future research on appearance-related biases in academic hiring and evaluation processes.

2 Model

We present a model of the value of beauty to employers. We allow workers' beauty to be valued by employers for two reasons: (i) because employers have a taste for beauty, i.e., they enjoy working next to attractive individuals; (ii) because beauty is correlated with productivity. Although not explicitly modeled, this correlation between beauty and productivity can either result from co-workers' taste for beauty, in which case they are eager to collaborate with attractive individuals and hence increase attractive workers' productivity, or because attractive individuals are better at selling their products, i.e., are more convincing presenters. We show that the two reasons for valuing beauty imply that (1) attractive individuals will have better labor market outcomes than less attractive individuals. (2) Overtime, as more information about a worker's actual productivity is revealed, the role of appearance in predicting the worker's labor market outcomes will become smaller. (3) Overtime, the intrinsic taste for beauty will continue to play a role, such that the role of appearance in predicting a worker's labor market outcome will not disappear.

Let individual i of beauty group g have a productive value v_{ig} and an intrinsic beauty value v_g for the employer, with weights δ and $1-\delta$ respectively. Thus, the total value of a worker to an employer is given by

$$Value = \delta v_{ig} + (1-\delta)v_g \tag{1}$$

The worker's productive value v_{ig} depends both on their beauty v_g and their ability ϵ_{ig}, which

is drawn from their beauty-group ability distribution:

$$v_{ig} = v_g + \epsilon_{ig}, \epsilon_{ig} \sim \mathcal{N}(0, \sigma^2_{\epsilon,g}) \tag{2}$$

This productive value is not fully observed by the employer. Instead, the employer only views, at each period t, the worker's beauty g and an imperfect signal about the worker's productivity, s_{igt}:

$$s_{igt} = v_{ig} + \eta_{igt}, \eta_{igt} \sim \mathcal{N}(0, \sigma^2_{\eta,gt}) \tag{3}$$

We will assume that this signal becomes more informative over time, such that the signal's noise decreases over time: $\sigma^2_{\eta,gt}$ declines with t.

The expected value of a worker's productivity v_{ig} given the productivity signal s_{igt} and her beauty g is therefore given by:

$$\begin{aligned} E(v_{ig}|s_{igt}) &= (1-\gamma_t)v_g + \gamma_t s_{igt} \\ \gamma_t &= \frac{cov(v_{ig}, s_{igt})}{var(s_{igt})} = \frac{\sigma^2_{\epsilon,g}}{\sigma^2_{\epsilon,g} + \sigma^2_{\eta,gt}} \end{aligned} \tag{4}$$

Combining these together, we have that the expected value for employers is given by:

$$EValue = \delta((1-\gamma_t)v_g + \gamma_t s_{igt}) + (1-\delta)v_g \tag{5}$$

Proposition 1: attractive individuals will have better labor market outcomes than less attractive individuals (by assumption)

Proposition 2: Overtime, as more information about a worker's actual productivity is revealed, the role of appearance in predicting the worker's labor market outcomes will become smaller. This is true because with time, more weight is placed on the more precise signal as γ_t converges to one, and the weight $1-\gamma_t$ on the group's productive value v_g goes to zero.

Proposition 3: Overtime, the intrinsic taste for beauty will continue to play a role, such that the role of appearance in predicting a worker's labor market outcome will not disappear. This is true because the intrinsic taste for beauty is captured by the term $(1-\delta)v_g$ which remains positive.

Thus, we can conclude that if the coefficient on beauty does not disappear over time, then there is an intrinsic value to beauty, or "a taste for beauty".

3 Data

Our data set contains information on all graduating students from ten of the top economics departments in the United States over the years 2002 to 2006.[5] For each graduate student we observe race, gender, graduation year, dissertation field, and the student's career path upon graduation and up to fifteen years after graduation. Career data include the number and quality (impact) of publications, tenure status, institution, and the institution's rank. Appearance data include the average attractiveness ratings of individuals' 2011 online photographs, as ranked by a random sample of 241 evaluators.

3.1 Career Data

Data for PhD students who graduated from ten of the top economics departments in the United States were collected based on each institution's library catalogue of dissertations for the years 2002-2006. Whenever library data were unavailable, we collected the data from ProQuest's dissertation database. From the dissertations' titles we extracted data on the field of research.[6] Overall, our sample includes 1106 PhD graduates, but the regression sample varies based on data availability for each outcome. The number of observations for each regression type is summarized in table A1.

Data on job placement are based on an institution's placement records and an online search of CVs conducted during October 2017. For citation history we obtained the cumulative number of citations for each individual in each year in our data set from CitEc: Citations in Economics, a service provided by RePEc (2021), and from Google scholar citations when citation data was unavailable on CitEc.[7] Ranking of economics departments was extracted from RePEc (2019), with

[5] Choice of universities was dictated by data availability, and includes Berkeley, Chicago, Harvard, MIT, NYU, Northwestern, Penn, Princeton, UCLA, and Yale.

[6] Fields were coded using JEL classification into the fields of Econometrics, Micro/Theory, Macro, International, Public, Labor, IO, Devel/Growth, Finance and Other.

[7] Yearly citation data were extracted during 2021.

a rank of 1 indicating the most highly ranked department based on faculty's impact-adjusted pages published in top 50 journals.[8]

The descriptive statistics for our sample are presented in Appendix Table A2. Our analysis sample consists of all students who graduated with a PhD in economics from ten of the top institutions between 2002 to 2006 for which we could find online photographs. There are 752 individuals of which 183 are women.[9] As for the distribution of PhD graduates across economic fields, men were significantly more likely to specialize in theory and finance, and women were significantly more likely to specialize in industrial organization. Our tests, however, show that there are no differences in the importance of appearance across fields.

Summary statistics for career variables are in the bottom panel of Table A4. The average RePEc (2019) rank of the PhD institution of our graduates is 16.7. Of the 636 graduates for which we have the first job, 75 percent were working in academia, 15 percent in a government or a public sector institution, and 10 percent in the private sector. Of those working in academia, the rank of the institution appears in the RePEc (2019) data for 388 individuals. The average rank of these first job institutions was 148.2. For the last observed (academic) job recorded in our data (in 2017), the average rank was 171.3, with some 90 observations lost between the time of first job and last observed job. Overall, in 2017 (11 to 15 years after graduating), the average number of citations 7 years post graduation was 219, and the average number of publications in 2017 was 78. This number of citations substantially exceeds the numbers reported by Hamermesh (2018) for the same stage of the career. This is because in Hamermesh (2018) the sample of individuals includes those who graduated from "top" 30 schools, while we focus on "top" ten.

3.2 Appearance Ratings

After collecting the photographs, we relied on online evaluators to provide appearance ratings. We adjusted raw ratings to account for heterogeneity of evaluators. We also analyze heterogeneity in the quality of the photographs to determine which confounding factors we need to control for in

[8]Ranking data was extracted in September of 2019. Our results are robust to using 2017 rankings instead.

[9]The share of women in our sample is the same as the share of women among all graduates in those ten of the top economics department during those years, regardless of the availability of the photograph.

our regressions.

3.2.1 Method

Photographs of the individuals in our sample were collected online in 2011 with the total of 752 photographs collected. Individuals were rated for how attractive they were based on these photographs by 241 U.S.-based workers of Amazon Mechanical Turk (AMT), an online marketplace for online workers.[10] Each evaluator was referred to a password-protected site, where the person provided their personal details such as age, gender, country of primary citizenship, and years of education. Each evaluator was then asked to rate the appearance of 50 individuals in our sample based on the photographs. The question asked about each individual photographed was: "On a scale of 1 to 10 (1 - not at all, 10 - very much), do you find this person attractive?".

Summary statistics on evaluators are presented in Appendix Table A3. Half of the evaluators were women, the mean age was 33, and they had on average 15 years of education. Each of the AMT evaluators rated 50 photographs. On average, each photograph in the sample was viewed and rated by 14 evaluators.

The ratings for each photograph were averaged across evaluators to produce the raw attractiveness score of the photographed individual. To capture the extent to which there was agreement on the appearance rating of each graduate, we also recorded the standard deviation of the ratings for each individual photographed. Evaluators tend to have idiosyncratic benchmarks when rating individuals' photographs and may vary in their tendency to give high or low ratings. For example, a rating of 1 given by a tough evaluator may be more equivalent to a rating of 3 given by a more lenient one. To standardize the appearance ratings across evaluators, we re-scaled each evaluator's ratings into a percentile ranking based on that evaluator's distribution of ratings. Since each evaluator rated 50 photographs, which were randomly and independently chosen from the sample, we assume each evaluator viewed photographs that were similarly distributed in terms of their appearance. The standardized appearance score for each individual in our sample was constructed

[10] Individuals were also rated for how intelligent they appeared based on these photographs. We asked for both impressions, since it was not clear *a priori* which dimension of appearance is most relevant for hiring, promotions, and overall academic success. Here we only report the results for attractiveness, because we did not uncover robust patterns for the effects of "looking intelligent" ratings.

as the average of the standardized ratings. For the rest of the analysis, we use this standardized score.[11]

3.2.2 The Ratings

Appendix Table A4 presents summary statistics for the attractiveness ratings. It displays the raw attractiveness ratings, the standardized attractiveness rating and the attractiveness rating when only subgroups of evaluators are considered: female evaluators, male evaluators and reliable evaluators. As can be seen in Table 1, all of these measures are highly correlated.

The raw attractiveness scores are presented at the top of Appendix Table A4, and Figure 1 depicts the raw distribution of attractiveness for men and women. It can be seen that the whole distribution of attractiveness for women is shifted to the right relative to men's attractiveness distribution.[12] Given the established finding that in the general population men are judged to be on average as attractive or good-looking as women (Hamermesh, 2011), this implies a selection of women in PhD economics programs such that they are on average better-looking than men in these programs.

The mean standardized attractiveness score for all graduates is 0.5 by construction. We see that men received on average a lower attractiveness score than women, with women rated 0.14 higher than men, which is 0.85 standard deviations higher. Both female and male evaluators gave higher attractiveness scores to women relative to men. The difference in the attractiveness ratings between female and male evaluators were not statistically significant. However, female evaluators were more in agreement about their ratings than male evaluators (as reflected by the lower standard deviation among women's ratings compared with men's ratings, 0.23 versus 0.21). This result was driven by the ratings of women's photographs rather than men's. The race of raters was not collected, however, at the time the data was collected, the AMT worker population included 83.5% whites and 4.4% blacks (Berinsky et al., 2012).

[11] In the robustness analysis we show that when we use raw scores instead, the results are qualitatively the same but are less precisely estimated.

[12] This is also true for the standardized attractiveness score we use throughout.

3.2.3 The Characteristics of Photographs

A concern might arise that a spurious correlation between the attractiveness of an individual and her academic success is driven by the quality of the photograph. This would be the case if higher ranked institutions produce better photographs which are taken professionally for the best appearance. If this were the case, the relationship between the rank of the institution and the attractiveness of their employees would be the result of reversed causality, and not because attractive individuals land better jobs. It is also possible that attractiveness as reflected by a photograph can be manipulated by individuals (by dressing in business attire, by choosing a professional photographer or by smiling), and the individuals or schools that manipulate the quality of photographs are a non-random subsample of our population. Another possibility is that more meticulous people have both better photographs and better papers. Therefore, we might find systematic differences between individuals based on their assessed attractiveness when, in fact, it is their ability or school quality that determines the quality of photographs.

Previous research has shown that the quality of photograph or the degree of primping has little influence on perceived beauty (Hamermesh et al., 2002). However, to fully address this concern, we investigate the role of the quality of the photograph. All photographs were coded for their size, background setting (home/leisure, office, or highly professional), dress code, and whether the individual in the photograph was smiling or not [13]. The descriptive statistics are found in Appendix Table A5. The size of the photographs wasn't uniform, with 11% being large, and 4% being smaller than usual. Some 56% of pictures had the photographed person smiling in them, with the fraction of women smiling at 71%, significantly higher than the 51% of men. Of all pictures 32% were taken at home, 34% were taken professionally. In 72% of the photos the individual was dressed for business.

We first test whether appearance rating depends on the characteristics of the photographs. To do so, we ran an OLS regression model predicting the attractiveness score based on the photograph characteristics (see Appendix Table A6). A large photo increases the attractiveness score for men (by 0.05). Smiling increases the attractiveness score of women (by 0.05). Having the photo taken

[13] Smiling has been found to be associated with a higher perception of beauty (Reis et al., 1990; O'Doherty et al., 2003).

at home is associated with a higher attractiveness score for men.

Because the coded characteristics of the photograph may be correlated, we conducted a factor analysis of the 6 photograph characteristics: large photo, small photo, photo taken at home, photo professionally taken, subject in business attire, subject smiling. This analysis revealed that the six items loaded on three distinct dimensions: professional photo, subject smiling, large photo (see Appendix Table A7). In all regression models we control for these three photograph quality factors.

4 Citations

The main measure of output for academics is their publications and more importantly citations. In fact, economists are evaluated and promoted based on the quality of their publications (Heckman and Moktan, 2020). Thus, we use the accumulated number of citations each individual received during their first 7 years after graduating. This measures the impact of their research at the time a tenure decision is due. We begin by demonstrating that appearance predicts actual research productivity, and provide some robustness test. We then continue to show that the predictive capacity of appearance diminishes as more concrete information about research productivity accumulate, highlighting that appearance may serve as a signal of productivity.

Using the productivity measure of citations as our dependent variables, we estimate OLS regression models with attractiveness as the main explanatory variable. In these regressions we control for the rank of the PhD institution and the rank of the first job, since both of these are predetermined 7 years after graduation.

We find that attractiveness predicts the success of publications, as measured by the number of citations. These results are reported in Table 2. In the first column we show that the rankings of PhD institutions and first jobs have small negative effects on the number of citations: that is, better quality (lower rank number) institutions are associated with more citations, as expected. In columns (2) we show that the total number of citations is strongly associated with attractiveness, even when we control for the picture quality factors. As for the magnitude, the coefficient of 308 on attractiveness corresponds to an increase of 0.17 standard deviations of citations 7 years post

graduation, following a one standard deviation increase in attractiveness.

Next, we explore whether the set of evaluators giving the appearance ratings matters for the results we obtained. We want to know whether the results depend on the gender of the evaluators and whether they are robust to excluding unreliable evaluators. Although the share of women graduates in economics is growing, men are still the majority of faculty. In 2015, 81% of tenured or tenure-track faculty were men (McElroy, 2016). Men make up a majority of the population assessing, responding to, and creating the environment in which appearance is valued. Hence, we might expect appearance scores constructed only from men's ratings to have a larger effect on outcomes than overall or women-only ratings. However, we do not find evidence for this prediction regarding the difference between male and female evaluators. When we estimated our model using appearance scores given only by male or only by female evaluators, we find no significant difference between the effect of males' evaluations and the effect of female's evaluations of appearance (columns (3) and (4)).[14]

Our last test discards ratings given by unreliable evaluators. We define reliable evaluators using a variation on Cronbach's α (Cronbach, 1951). An evaluator is reliable if the sum of square distance of each of his normalized rating from the mean rating by others is small. In this way, we identify 19 out of 241 evaluators as unreliable. The results when using only reliable evaluators are statistically not different from the results obtained when using all evaluators (column (5)). We conduct more robustness tests and test for heterogeneity in section 6 below.

The results above establish that attractiveness predicts citations, and might therefore serve as a signal for research productivity. It is to be expected that the predictive power of a noisy signal would decline as more information is available. To show this is also true in our case, we next regress the number of citations in years 5 through 7 on attractiveness, and gradually introduce as regressors the total number of citations in years 1, 2, 3 and 4. We ask whether the predictive power of attractiveness on later citations declines when we can observe actual citations in earlier years. The results of these OLS regressions presented in table Table 3. Indeed the coefficient on attractiveness becomes smaller in magnitude and significance as we move from columns (1) to (5).

[14] Recall that our evaluator sample has 52% women.

5 Job Outcomes

We are now ready to investigate whether attractiveness scores predict job outcomes at each stage of the career we can measure: rank of PhD institution, type of first job, rank of first job, and rank of last job observed. We begin by testing whether the rank of the PhD granting institution is associated with attractiveness. This is important for two reasons: first, the results will tell us whether attractiveness might be a factor in graduate admissions and PhD completion probability (although we cannot distinguish between these two because we only observe graduation data); second, it will tell us whether we need to control for the rank of the PhD institution in the following regressions. Next, we test whether attractiveness plays a role in the type of the first job individuals land after graduation: academic, government, or private sector. We then zero in on the ranking of academic institutions and test whether the ranking of the first job as well as the ranking of the last observed job are affected by attractiveness.

5.1 Empirical Approach

Most of our dependent variables are ranks. Therefore, it is unreasonable to assume that any explanatory variable will have a linear effect on the dependent variable. For this reason, our main approach is ordered logit.[15] Specifically, we estimate the following regression:

$$Pr\left(Y_i = k\right) = Pr\left(z_{k-1} < \mathbf{X_i'}\beta < z_k\right) = \frac{1}{1+e^{-z_k+\mathbf{X_i'}\beta}} - \frac{1}{1+e^{-z_{k-1}+\mathbf{X_i'}\beta}}, \tag{6}$$

where k is a given outcome value, z_k is the set of estimated cutoffs of the latent variable, $\mathbf{X_i'}$ is the matrix of explanatory variables, and β is the coefficient that is assumed to be the same across cutoffs.

The only variable that is not ordered is the type of the first job. For this regression, we

[15] This approach is less parametric than using, for example, log-linear regression, in that it does not require a functional form for the effect of a latent variable on the outcome, due to estimated cut-off constants. Our results are robust to using OLS instead of ordered logit.

estimated a multinomial logit model with outcomes $j = \{private, academia, government\}$:

$$Pr\left(Y_i = j\right) = \frac{e^{\mathbf{X_i}'\beta_j}}{\sum_{n=j}^{J} e^{\mathbf{X_i}'\beta_n}}, \tag{7}$$

where J is the number of outcomes and coefficients β_j vary by outcome.

5.2 PhD Institution

Table 4 reports our results for the effect of attractiveness on the ranking of the PhD institution. Remember that the best institution is ranked 1, therefore a negative coefficient implies a higher rank. In square brackets we report regression coefficients as odds ratios, with the lack of the effect represented by a coefficient of 1. In the specification with no control variables, where the only explanatory variable is the attractiveness score (column (1)), we find a strong and significant effect: more attractive individuals get their PhDs from better ranked schools. The effect remains effectively unchanged if we include indicators for cohort (year of graduation, column(2)), or for characteristics of the photographs (column (3)).

This finding could be driven by two factors: either more attractive individuals are more likely to be accepted into higher ranked schools, or, once accepted, more attractive individuals are more likely to complete the program, or both. Since we don't observe PhD program admissions, but only graduations, we cannot disentangle these two effects. Since the ranking of the PhD program is likely to be important to the development of academic careers, and it is correlated with attractiveness score, we will control for the ranking of the PhD program in all our subsequent regressions to isolate the direct effect of the attractiveness score.

5.3 First Job

We test whether graduates' appearance predicts which sector job they will land, i.e., whether they will work in the private sector, academia, or the government (including international organizations). The results are reported in Table 5, and in square brackets as odds ratios. In the first column we don't control for photo quality factors, in the second we do. The omitted category in the

regression is "private sector." The coefficients on attractiveness indicate that graduates with higher attractiveness scores are less likely to end up in either academia or government jobs, compared to the private sector. This result echoes Biddle and Hamermesh (1998) who document the selection of attractive-looking law graduates into the private sector. This suggests that attractiveness has more value in the private sector, either because in the private sector there are end consumers who care about appearance, or because regulation mitigates the attractiveness premium in the public sector or academia. Note that there is no statistically significant difference in terms of the effect of attractiveness between academic and government jobs.

Interestingly, the rank of PhD institution does not have an effect (the coefficient is quite precisely zero), suggesting that the distribution of first job type is quite uniform for graduates of all the PhD institutions we considered.[16]

We now focus on academic careers and test for the effect of attractiveness on the ranking of the first academic job. The results are reported in Table 6. As before, lower rank is associated with a higher quality institution. We control for cohort indicators in all regressions. In the first column, we test whether the rank of the PhD institution predicts the rank of the first academic job, and find that there is, indeed, a positive and statistically significant, but rather small, effect. Thus, we continue to control for the rank of the PhD institution. We add the attractiveness score in column (2) and find that higher score is strongly associated with better quality institution, including when we control for the picture quality (column (3)).

Putting the two sets of results together we have to acknowledge a possibility of a selection issue when interpreting the effects of attractiveness on the ranking of the first academic job. For PhD students in top PhD programs in economics, private sector jobs are usually not a top priority, especially for the best students — most students consider academic positions as their first choice and the reason they enrolled in these programs in the first place. Students with lower quality CVs likely have a choice between lower-ranked academic offers (if any) and private sector jobs. Among those, more attractive students are likely to see higher quality private sector jobs for reasons discussed in the literature. As a result, less attractive students with lower quality CVs are more likely to

[16] Since we focused on top schools, we do not believe that this particular result generalizes to the overall population.

end up in lower-ranked academic positions than more attractive students. This would result in the positive association between attractiveness and quality of the first academic job that we find in Table 6. This is not, however, a problem for the rest of our analysis once we control for the rank of the first academic job.

5.4 Later Jobs: Uncovering the Value of Attractiveness

Why would graduates' appearance be relevant for the hiring outcome? If appearance and productivity are related but ability is not fully observed, or if employers care about both appearance and ability, then appearance would turn out to be significant in predicting employment outcomes. To distinguish between these two possibilities, we can use the insights provided by Altonji and Pierret (2001) and our model. If the coefficient on appearance falls over time, we can infer that appearance initially serves as a signal of productivity, and that its importance as a signal declines over time as more information of true productivity and actual publications is revealed. Thus, observing a declining coefficient on attractiveness over time can provide evidence for statistical discrimination. Insofar as the decline is small or the coefficient remains stable over time, we can infer that there remains an additional value of attractiveness to employers that is unrelated to its value as a signal of future research productivity.

To test whether the effect of appearance becomes weaker with time and information, we look at the ranking of the job held by individual in 2017 (when we completed our employment data collection), conditional on the rank of the first job.[17] The results of the ordered logistic regression models predicting the rank of the last observed job on attractiveness are reported in Table 7. All regressions include rank of PhD institution, rank of first job institution, cohort dummies and picture properties.

In column (1) we observe that individuals with a higher attractiveness score end up in better ranked institutions, even conditional on the ranking of their PhD program and the ranking of their first job. Note that the rank of the PhD institution and rank of the first job both have a positive and statistically significant effect, but rather small in magnitude. In the next columns (2-4) we

[17] In these regressions we limit the sample to those whose last observed job was in academia. We do not, however, exclude individuals whose first job post-graduation was outside academia. Our results are robust to excluding them.

gradually add the citation information which is accumulated over time, and in column (5) we add the total number of publications in 2017. We see that attractiveness continues to be an important factor, with coefficient only slightly smaller (and not statistically different) as we control for more information.

Moreover, if we compare the effect of attractiveness on the ranking of the last observed job to its effect on the ranking of the first job, we find that these are not statistically different. Thus, we do not observe a decline over time in the importance of attractiveness for hiring and promotions in economic departments, which makes it unlikely that our results are explained by statistical discrimination.[18]

Recall that our model predicts that adding information on research productivity (citations), would decrease the signaling value of attractiveness. However, as far as attractiveness is valued by employers for its aesthetics, teaching-capacity, or other non-research related product, then the coefficient on attractiveness should remain statistically different than zero. This is indeed what we find. Thus, our empirical investigation, guided by our theory, leads us to conclude that although attractiveness can signal research productivity, and thus can be used by employers as a signal of future productivity, it is mainly valued for its own sake or for reasons other than research productivity.

5.5 Magnitudes

To evaluate magnitudes of the effect of attractiveness on career outcomes, we plot the distribution of predicted probabilities evaluated at means of all variables vs. predicted probabilities evaluated at mean plus one standard deviation of attractiveness and means of other variables. For all regression samples, mean attractiveness is around 0.5 and standard deviation is around 0.17, thus we compute predicted probabilities for attractiveness values of 0.5 and 0.67.[19] The results are reported in Figure 2.

[18] We cannot rule out, however, that the reason is that we don't observe people for long enough: the number of years from first job hiring to last observed job hiring or promotion decision (8 on average) might not be enough for alternative information about true productivity to be revealed.

[19] Since sample varies for regressions evaluating different outcomes, we compute exact mean and standard deviation of each regression sample, but differences are negligible.

We can see that a one standard deviation increase in attractiveness increases the probability of being at the top-three PhD programs, with combined increase of probability from 36 to 40 percent, while reducing the probability of being in the lowest three of our list of PhD programs, with combined decrease of probability from 25 to 22 percent.

In terms of the type of the first job, we find that one standard deviation increase in attractiveness increases the probability that the first job is in the private sector from 9.5 to 13.5 percent, while reducing the probability of getting first job in the government from 14.5 to 13.2 percent, leaving the probability of first job in academia only marginally lower (from 76 to 73 percent).

Among those in academia, a one standard deviation increase in attractiveness improves the probability of getting a first job in an above-median ranked institution from 52 to 59 percent, with a corresponding decline in the probability of getting a first job in a below-median ranked institution. The effect for the last observed job is an increase from 47 to 54 percent. We can also see that the better ranked is the institution, the larger is the impact of increased attractiveness.

These effects are not overwhelmingly large, but they are quite substantial in magnitude.

6 Heterogeneity and Robustness Tests

We investigate whether our results are robust to various alternative measures and specifications and whether some expected heterogeneity can be observed in our data. Here we briefly discuss this analysis conducted for our two main findings on citations and on the rank of the last job observed. All the tables are in the Appendix.

Heterogenous Effects We begin by testing whether specific sub-samples drive our results. First, we ask whether the importance of attractiveness for citations and job placement is concentrated in business schools. This could be the case since teaching is particularly important in business schools and the literature has found that attractiveness predicts student's evaluations (Sen et al., 2010). We test whether our results are driven by business schools, by interacting the attractiveness score with a business school indicator. For citations we find that the coefficient on attractiveness

is six times larger for people in business schools relative to other schools (Table A8 column (2)). However, the effect of attractiveness on the rank of the last observed job is not statistically different for graduates located in business schools relative to other schools (Table A10 column (2)).

Another possibility is that a specific demographic is driving our results. Individuals that look asian on the photographs constitute 17 percent of our sample. Figure A2 shows that individuals that look asian tend to have different distributions of attractiveness scores when rated by predominantly white AMT workers.[20] To test whether this biases our result, we include an interaction term between attractiveness and an indicator for "Asian Looking" and re-estimate our key regressions. For both regressions the interaction term in not significant, and the main coefficient of interest remains unchanged (Table A8 column (3) and Table A10 column (3)).

We next explore whether the results vary by gender. Including a female indicator in the citation regression, we observe that the main effect on attractiveness are larger. While the negative coefficient on the "Attractiveness X Female" is not significant, it is marginally so. Hence the results suggest that attractiveness is a better predictor of citations for men relative to women (Table A8 column (4)). When the effect of attractiveness on the rank of the last observed job is estimated separately for women and for men, we find that the results seem to be driven by women and not men (Table A10 columns (4) and (5)). Note that there are substantially fewer women than men in the sample, and therefore the effects are less precisely estimated for women.

Robustness First we verify that our results are not driven by a specific ranking of institutions. In the main analysis we used 2019 rankings. It turns out that rankings change quite a bit from year to year. To be sure that our results are not driven by any specific institution, we repeat our analysis with 2017 rankings. The results are reported in Table A9 column (2) and Table A11 column (2). We can see that they are not different from the benchmark, presented in column (1).

It is also possible that there is a relationship between attractiveness and the choice of specific field in economics and that academic success varies by field. It has been shown, for instance, that

[20]Data on race were extracted from the photographs by visual examination. For our purposes, this is a relevant measure because this is how a person's race is perceived by potential employers and colleagues. Only 8 individuals in our sample were identified as looking black and 130 were identified as looking asian. Since there are only eight black-looking individuals in our sample, the effect of looking black was never significant in any model.

citation counts vary across economic fields (Anauati et al., 2016). To test for the possibility that our results are driven by specific fields, we include field fixed effects in our regressions. We find that the results are not affected by this addition (Table A9 column (3) and Table A11 column (3)).

Next, we conduct a test to establish that our results are not driven by reverse causality resulting from the quality of the photographs, which might be correlated with the rank of the institution where the photograph was taken. Since the last observed job was recorded in 2017, and photos were collected in 2011, the ranking of the institution in which a photo was taken is predetermined in the regressions for the last observed job and similarly for citations. Thus, in Table A9 column (4) and Table A11 column (4) we control for the ranking of the institution in which the photo was taken. This should alleviate most concerns about reverse causality. We find that the effect of attractiveness is not affected by this control and that, instead, the rank of the first job is no longer significant.[21]

We also test whether our results are driven by the exact empirical specification we chose. Because citations are truncated at zero, and highly skewed, we test whether the results hold when we use as our dependent variable the natural log of (1+citations). We find similar results to our main specification, see Table A9 column (5). For the rank of last observed job regression, our approach is to re-estimate it using OLS and Ordered Probit models. We find that our results are robust to these specification changes (Table A11 columns (5) and (6).

Finally, we explore whether the set of evaluators giving the appearance ratings matters for the results of the logistic regression model predicting the last job (similar to the analysis provided for citations in Table 2). In Table A12 we estimated our models using appearance scores given only by male or only by female evaluators. Although the coefficient on the attractiveness score given by male raters is larger than the same coefficient given by female raters, the difference in not statistically significant (columns (2) and (3)). Hence we conclude that there is no significant difference between the effect of attractiveness as evaluated by males relative to females on the rank of the last observed job. Our last test discards ratings given by unreliable evaluators. The results when using only reliable evaluators are also not statistically different than the results when using

[21] Figure A1 in the Appendix shows that the ranking of the first job and the ranking of the institution that took the photo are nearly perfectly correlated.

all evaluators (column (4)).

Overall, we find that our results are robust to empirical specification, additional controls, and definitions of the measures we use.

7 Conclusion

This paper explores the role of scholars' appearance on their hiring and publication success, and finds that appearance matters. Attractiveness is related to educational achievements, to hiring, and to publication outcomes. In particular, more attractive individuals are more likely to graduate from better ranked PhD institutions and are more likely to go to the private sector after completing their PhD. Among those going into academia, more attractive individuals are more likely to get jobs at higher-ranked institutions, and have better publication records. The differences are substantial in magnitude.

Why might appearance matter for citations, given that economics publications usually do not include authors' photos, and are supposedly cited for their impact and influence alone? There are many potential mechanisms discussed in the literature. Attractiveness has been found to be related to individual characteristics that are developed through a process of expectancy confirmation (Darley and Fazio, 1980; Langlois, 1986; Langlois et al., 2000). In this process, stereotypes regarding attractive people being more competent than less attractive people generate expectations that lead to consistently differential judgment and treatment (Jackson et al., 1995). These expectations are internalized and the differential treatment causes development of differential behavior, traits, and self-views (Judge et al., 2009). Thus, attractive people become more confident and therefore might be more likely to solicit constructive comments, and, as a result, may produce higher quality papers that are cited more. Due to higher confidence, they might be more likely to submit their papers to conferences and therefore their papers will get higher exposures. They might also be more charismatic when presenting their papers and therefore provide better marketing for their papers and, as "good presenters," might be more likely to be invited to seminars and future conferences.

Could it be the case, then, that hiring and promotion committees are simply using appearance

as a proxy for future academic productivity? Our finding of a direct impact of appearance on academic productivity, as measured by citations, could have rationalize the appearance bias in hiring and promotion. However, guided by our model, the empirical analysis reveals that hiring committees are probably not engaged in such reasoning. We find that good looks are valued by hiring committees in ways that are not related to research productivity.

Can the same underlying forces which make beauty affect productivity explain also why more attractive individuals end up in better jobs? Stinebrickner et al. (2019) provides evidence that the beauty wage premium for college graduates appears only in jobs where attractiveness is likely to affect productivity, with large premiums attached to jobs that require interpersonal interaction. Even though much academic work is conducted individually, appearance may influence success because labor market outcomes depend on human interactions. Hiring, academic publications, and citation counts are likely to be affected by the success with which a paper was presented in seminars and conferences. Moreover, good appearance might increase a person's chances of being invited as a co-author.

Our analysis uncovers two mechanisms for why looks are valuable. Employers have a taste for looks, which is independent of their assessment of and value for the candidates' talent and productivity (Becker, 2010). And, appearance and productivity are inherently correlated. Good appearance thus gets you hired and published, both because you are a better communicator and because people perceive you as such. Our analysis allows us to detect these two explanations and distinguish between them. Both mechanisms underscore the importance of human interaction needed for the appearance effect to take place. The nature of the academic job requires human interactions, and humans care about appearance. In this way, academia is not so different from other industries.

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Figure 1. Distribution of attractiveness of men and women

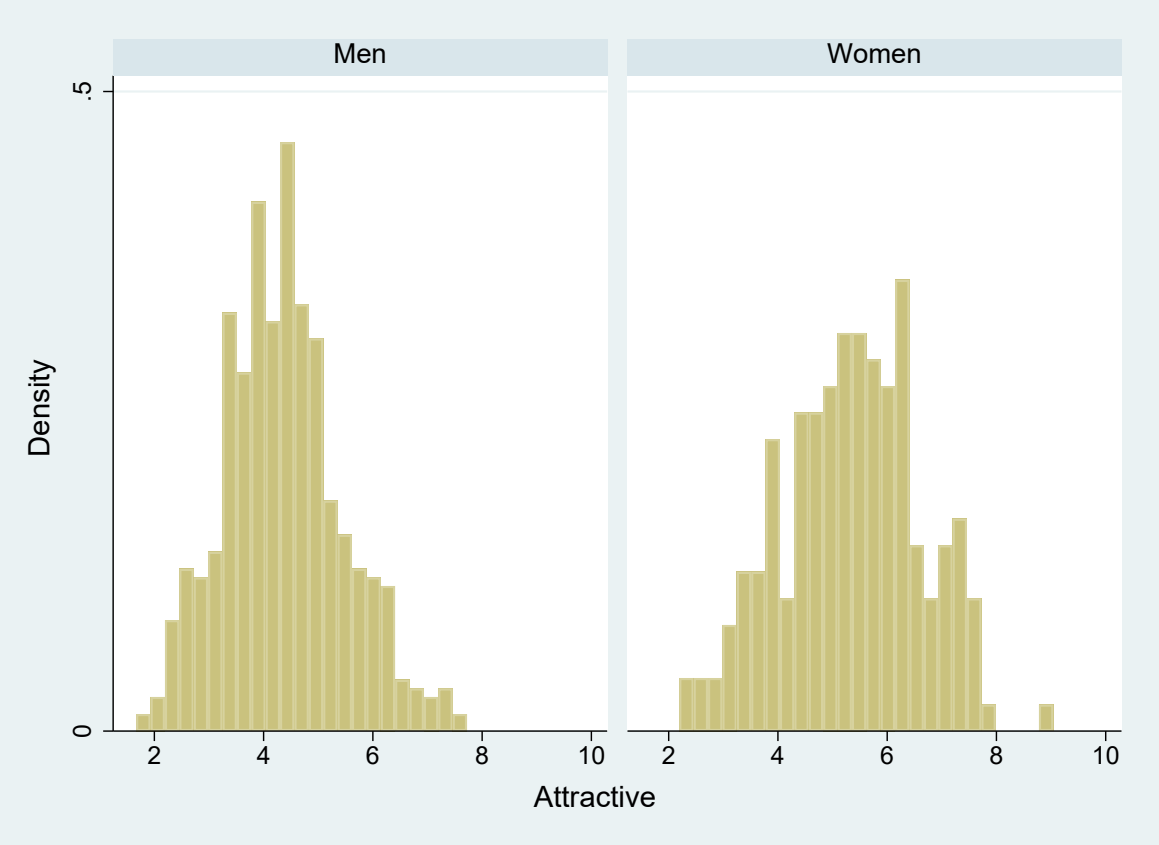

Figure 2. Distribution of predicted probabilities across outcomes

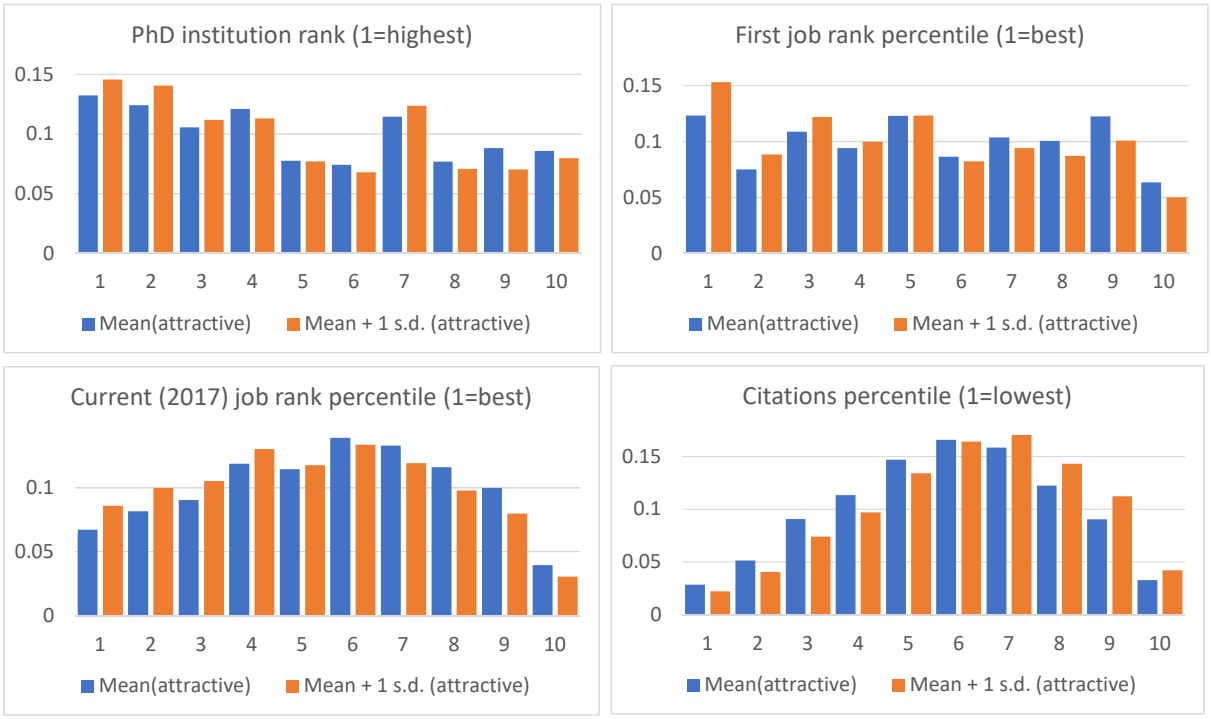

Table 1. Correlations of different attractiveness measures

Attractivness measure	Standardized	By female raters	By male raters	By reliable raters	Raw
Standardized	1.0000				
By female raters	0.9329	1.0000			
By male raters	0.8967	0.7063	1.0000		
By reliable raters	0.9933	0.9392	0.8763	1.0000	
Raw	0.9196	0.8551	0.8203	0.9121	1.0000

Table 2. OLS regression models predicting the total number of citations 7 years post graduation by attractiveness score

	(1)	(2)	(3)	(4)	(5)
Attractiveness score		308.462***			
		(92.570)			
Attractiveness (by male raters)			269.408***		
			(87.976)		
Attractiveness (by female raters)				260.008***	
				(84.065)	
Attractiveness (by reliable raters)					277.662***
					(88.776)
Attractiveness (raw score)					
Rank of PhD institution	-7.008***	-6.418***	-6.511***	-6.443***	-6.447***
	(1.227)	(1.231)	(1.238)	(1.234)	(1.234)
Rank of first job institution	-0.220**	-0.203**	-0.199**	-0.207**	-0.207**
	(0.087)	(0.087)	(0.087)	(0.087)	(0.087)
Google scholar indicator	198.346***	188.577***	185.957***	193.160***	189.667***
	(39.556)	(39.227)	(39.455)	(39.268)	(39.302)
Professional photo factor		18.293	14.319	21.350	18.146
		(20.237)	(20.354)	(20.373)	(20.283)
Smiling on the photo factor		-46.798	-46.892	-45.959	-46.083
		(44.479)	(44.680)	(44.600)	(44.583)
Large photo factor		24.112	27.277	28.184	25.560
		(80.742)	(81.051)	(80.932)	(80.914)
Constant	209.030	62.352	100.492	68.955	75.190
	(136.875)	(144.439)	(142.490)	(145.317)	(144.412)
Observations	301	301	300	301	301
Adjusted R^2	0.187	0.208	0.204	0.204	0.205

Notes: Cohort dummies included in all regressions but not reported. Standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 3. OLS regression models predicting the number of citations 5 to 7 years post graduation by attractiveness score

	(1)	(2)	(3)	(4)	(5)
Attractiveness score	173.635***	126.593***	108.304**	87.002*	61.844
	(54.791)	(48.813)	(46.636)	(44.506)	(40.187)
Rank of PhD institution	-3.837***	-2.854***	-2.519***	-2.182***	-1.698***
	(0.729)	(0.655)	(0.627)	(0.599)	(0.543)
Rank of first job institution	-0.127**	-0.103**	-0.093**	-0.081*	-0.064*
	(0.051)	(0.045)	(0.043)	(0.041)	(0.037)
Google scholar indicator	124.907***	104.321***	95.621***	86.187***	72.115***
	(23.218)	(20.692)	(19.781)	(18.884)	(17.089)
Total citations year 1		1.332***			
		(0.149)			
Total citations year 2			1.109***		
			(0.102)		
Total citations year 3				0.926***	
				(0.073)	
Total citations year 4					0.829***
					(0.051)
Constant	82.538	96.881	100.697	100.284	99.274
	(85.492)	(75.738)	(72.175)	(68.631)	(61.789)
Observations	301	301	301	301	301
Adjusted R^2	0.228	0.394	0.450	0.503	0.597

Notes: Cohort dummies and picture properties included in all regressions but not reported. Standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table 4. Ordered logistic regression models predicting the rank of PhD institution by attractiveness score

	(1)	(2)	(3)
Rank of PhD institution			
Attractiveness score	-0.810**	-0.820**	-0.822**
	(0.367)	(0.371)	(0.374)
	[0.445]	[0.440]	[0.440]
Professional photo factor			-0.054
			(0.083)
Smiling on the photo factor			-0.098
			(0.171)
Large photo factor			0.076
			(0.355)
Observations	752	752	752
Pseudo R^2	0.001	0.002	0.002

Notes: Dependent variable is the rank of PhD institution with best institution ranked 1. Cutoff estimates are omitted, but available upon request. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.

Table 5. Multinominal logistic regression models predicting the type of first job by attractiveness score

	(1)	(2)
Job type is "academic"		
Attractiveness score	-1.754**	-1.723**
	(0.768)	(0.769)
	[0.173]	[0.179]
Rank of PhD institution	0.004	0.004
	(0.010)	(0.010)
Constant term	2.834***	2.860**
	(0.479)	(0.480)
Job type is "government"		
Attractiveness score	-2.518***	-2.336**
	(0.944)	(0.938)
	[0.081]	[0.097]
Rank of PhD institution	0.003	0.004
	((0.012)	(0.013)
Constant	1.635***	1.532***
	(0.569)	(0.568)
Photo quality factors	No	Yes
Observations	636	636
Pseudo R^2	0.008	0.031

Notes: Dependent variable is type of first job. Omitted category is "private." Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.

Table 6. Ordered logistic regression models predicting the rank of first job by attractiveness score

	(1)	(2)	(3)
Attractiveness score		-1.169**	-1.245**
		(0.531)	(0.534)
		[0.311]	[0.288]
Rank of PhD institution	0.028***	0.027***	0.028***
	(0.007)	(0.007)	(0.007)
Professional photo factor			0.167
			(0.111)
Smiling on the photo factor			0.107
			(0.250)
Large photo factor			0.276
			(0.466)
N	388	388	388
Pseudo R^2	0.006	0.007	0.008

Notes: Dependent variable is the rank of the first job institution (academic institutions only). Cohort dummies included in all regressions but not reported. Cutoff estimates are omitted, but available upon request. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.

Table 7. Ordered logistic regression models predicting the rank of last observed job by attractiveness score

	(1)	(2)	(3)	(4)	(5)
Attractiveness score	-1.356**	-1.258**	-1.206**	-1.130*	-1.216**
	(0.609)	(0.611)	(0.612)	(0.613)	(0.618)
	[0.258]	[0.284]	[0.299]	[0.323]	[0.297]
Total citations year 1		-0.003*			
		(0.002)			
Total citations year 2			-0.003**		
			(0.001)		
Total citations year 3				-0.003***	-0.002*
				(0.001)	(0.001)
Total number of publications					-0.002*
					(0.001)
Rank of PhD institution	0.013*	0.011	0.010	0.009	0.009
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Rank of first job institution	0.007***	0.007***	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	297	297	297	297	297
Pseudo R^2	0.048	0.050	0.051	0.052	0.053

Notes: Dependent variable is the rank of last observed job institution (academic institutions only). Cohort dummies and picture properties included in all regressions but not reported. Cutoff estimates are omitted, but available upon request. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.

Appendix A Additional Tables and Charts

Figure A1. Rank of first institution and Rank of photo institution, scatter plot

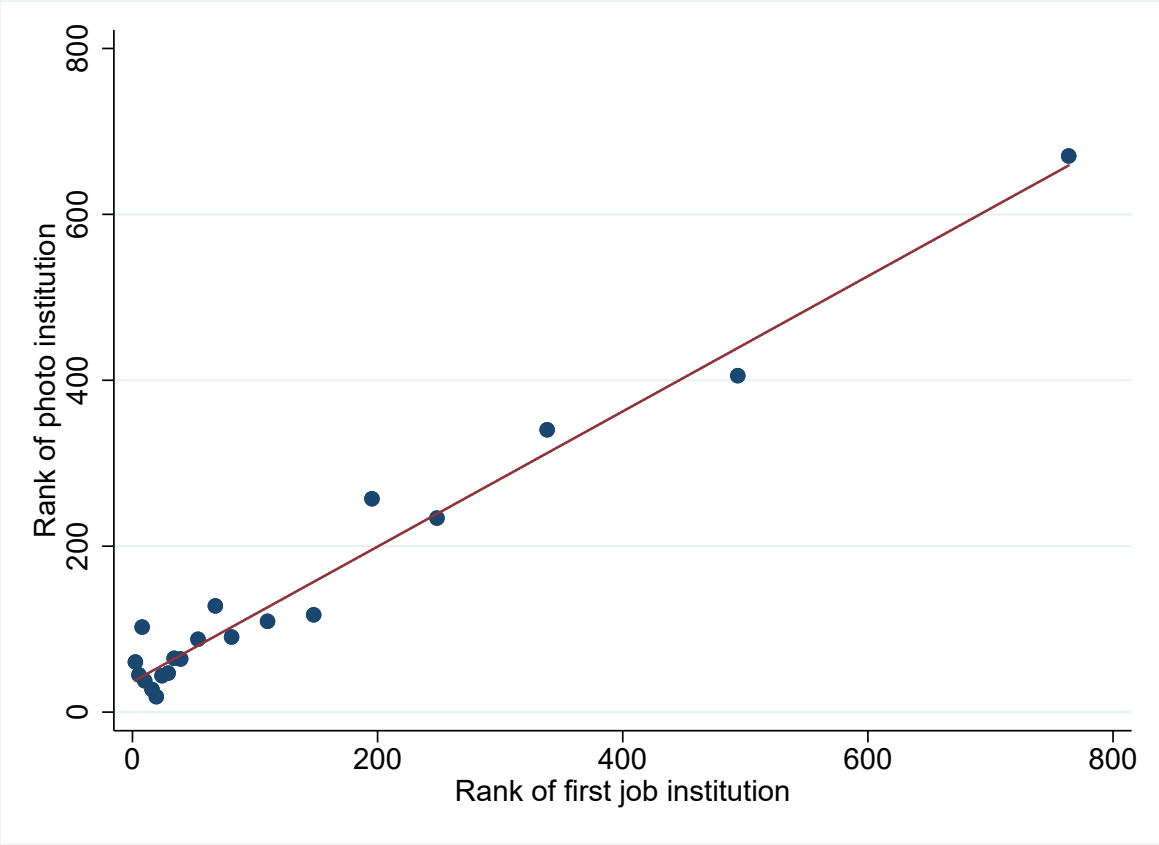

Figure A2. Distribution of attractiveness by whether individuals look asian

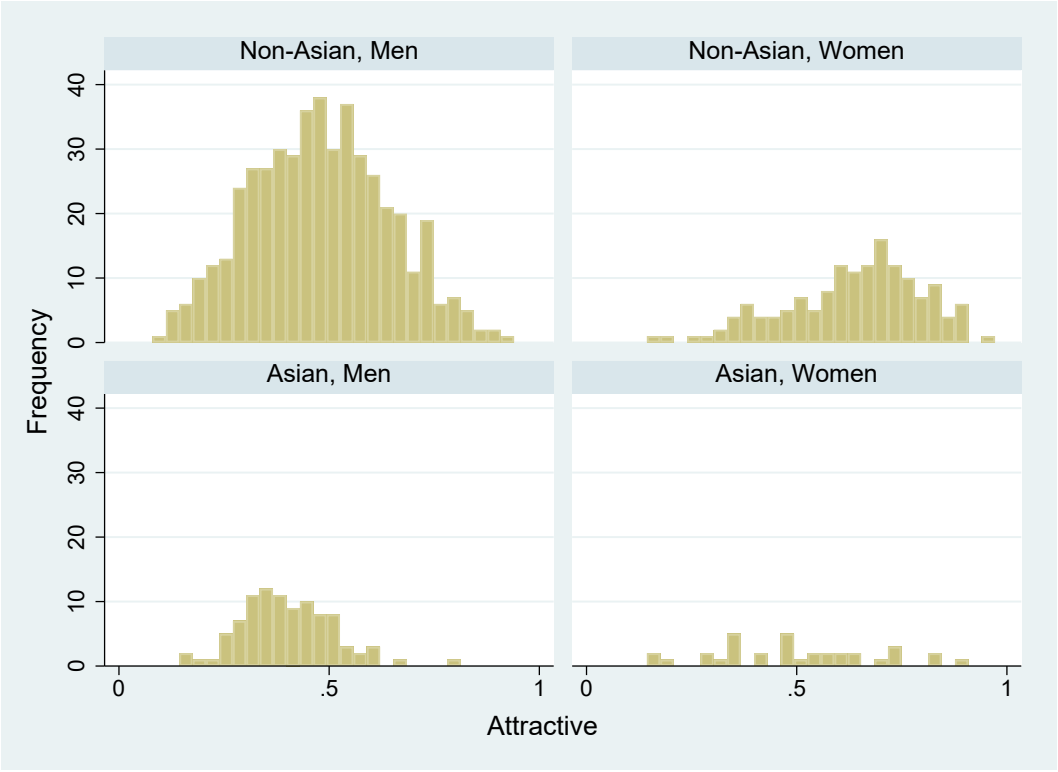

Table A1. Number of observations

	N
Full sample of Phd graduates	1106
Attractive score	752
Type of first job	636
Rank of first job	388
Citations	301
Rank of last observed job	297
Rank of photo institution	276

Table A2. Descriptive statistics: graduates

	mean	sd	min	max	count
Attractive	0.50	0.17	0.08	0.94	752
Female	0.24	0.43	0.00	1.00	752
Asian	0.17	0.38	0.00	1.00	752
Cohort graduation year	2004	1.45	1999	2006	752
Devel/Growth	0.07	0.26	0.00	1.00	752
Econometrics	0.04	0.20	0.00	1.00	752
Finance	0.11	0.32	0.00	1.00	752
IO	0.07	0.25	0.00	1.00	752
International	0.08	0.27	0.00	1.00	752
Labor	0.13	0.34	0.00	1.00	752
Macro	0.10	0.30	0.00	1.00	752
Micro/Theory	0.21	0.41	0.00	1.00	752
Public	0.04	0.20	0.00	1.00	752
Other	0.14	0.35	0.00	1.00	752
Professional photo factor	-0.00	0.78	-1.34	0.92	752
Smiling photo factor	0.00	0.40	-1.74	0.71	752
Large photo factor	0.00	0.20	-0.55	0.67	752
Attractive (raw score)	4.60	1.21	1.67	8.78	752
Attractive (by reliable raters)	0.50	0.18	0.08	0.98	752
Rank of PhD institution	16.70	13.18	1.00	39.00	752
First job is academic	0.75	0.44	0.00	1.00	636
First job is government	0.15	0.36	0.00	1.00	636
First job is private	0.10	0.31	0.00	1.00	636
Rank of first job	148.19	193.63	1.00	949.00	388
Last observed job is academic	0.81		0.00	1.00	366
Rank of last observed job	171.28	196.45	1.00	949.00	297
Publications at last observed job	77.62	100.30	1.00	1000.00	297
Citations 7 years post graduation	218.53	308.88	0.00	1913.00	278
Rank of photo institution	146.00	193.28	1.00	827.00	278

Table A3. Descriptive statistics: raters

	mean	sd	min	max
Female	0.52	0.50	0	1
Age	33.26	10.89	18	71
Years of education	15.22	2.44	9	20
Photographs rated	50.71	59.75	1	905
N	241			

Table A4. Appearance ratings of Ph.D graduates in top schools, by gender

	All Graduates		Men Graduates		Women Graduates		Men-Women
	mean	sd	mean	sd	mean	sd	difference in means
Attractive (raw)	4.60	1.21	4.36	1.09	5.34	1.26	-0.978***
S.D. of attractive (raw)	0.23	0.05	0.23	0.05	0.22	0.06	0.204***
Attractive	0.50	0.17	0.47	0.16	0.61	0.18	-0.144***
S.D. of attractive rating	0.23	0.05	0.23	0.05	0.22	0.06	0.004
Attractive by female raters	0.50	0.19	0.46	0.18	0.62	0.18	-0.166***
S.D. of attractive by female	0.21	0.07	0.22	0.07	0.20	0.07	0.015***
Attractive by male raters	0.50	0.18	0.47	0.17	0.60	0.20	-0.127***
S.D. of attractive by male	0.23	0.08	0.22	0.08	0.23	0.09	-0.007
Attractive by reliable raters	0.50	0.18	0.46	0.16	0.62	0.18	-0.152***
S.D. of attractive by reliable raters	0.22	0.06	0.22	0.05	0.22	0.06	0.007*
N	752		569		183		

Notes: Last column reports difference in means, with t-test, where * Denotes significance at 10%; ** Denotes significance at 5%; *** Denotes significance at 1%

Table A5. Descriptive statistics: photograph characteristics

	All Photos		Men's Photos		Women's Photos	
	mean	sd	mean	sd	mean	sd
Large photo	0.11	0.31	0.12	0.32	0.08	0.27
Small Photo	0.04	0.20	0.04	0.19	0.05	0.22
Smiling	0.56	0.50	0.51	0.50	0.72	0.45
At home	0.32	0.47	0.33	0.47	0.30	0.46
Professional photo	0.34	0.47	0.35	0.48	0.32	0.47
Business attire	0.72	0.45	0.73	0.44	0.67	0.47
N	752		569		183	

Table A6. Models predicting attractiveness based on photo properties

	(1) All	(2) Men	(3) Women
Woman	0.146***		
	(0.014)		
Large photo	0.050***	0.055***	0.005
	(0.019)	(0.020)	(0.048)
Small photo	0.046	0.048	0.052
	(0.030)	(0.035)	(0.059)
Smiling	0.013	0.002	0.047
	(0.012)	(0.013)	(0.029)
At home	0.024	0.032*	0.007
	(0.015)	(0.018)	(0.031)
Business attire	0.003	0.002	0.002
	(0.014)	(0.017)	(0.029)
Professional photo	0.008	-0.002	0.041
	(0.014)	(0.016)	(0.032)
Asian	-0.091***	-0.075***	-0.133***
	(0.015)	(0.018)	(0.032)
Constant	0.454***	0.458***	0.581***
	(0.017)	(0.019)	(0.034)
N	752	569	183
R^2	0.183	0.058	0.127
Adjusted R^2	0.174	0.046	0.092

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%.

Table A7. Results from rotated factor analysis: photo characteristics

	Factor1(professional)	Factor2(smiling)	Factor3(large)	Uniqueness
Small photo	0.0282	-0.2760	-0.0829	0.9161
Large photo	-0.0923	0.1223	0.1600	0.9509
Business attire	0.5328	0.0796	-0.0517	0.7071
At home	-0.6810	0.0982	0.0274	0.5258
Professional photo	0.6025	0.0919	0.0435	0.6266
Smiling	-0.0031	0.2501	-0.0392	0.9359

Table A8. Hetrogeneity: OLS regression models predicting the number of citations at year 7 by attractiveness score

	(1)	(2)	(3)	(4)
Attractiveness score	308.462***	201.196**	336.707***	505.000***
	(92.570)	(92.324)	(98.966)	(117.218)
Rank of PhD institution	-6.418***	-6.234***	-6.313***	-6.136***
	(1.231)	(1.200)	(1.245)	(1.216)
Rank of first job institution	-0.203**	-0.179**	-0.193**	-0.204**
	(0.087)	(0.084)	(0.088)	(0.085)
Google scholar indicator	188.577***	175.893***	191.625***	191.446***
	(39.227)	(38.260)	(39.411)	(38.645)
Business School		-619.040***		
		(218.885)		
Attractiveness X Business		1288.993***		
		(378.522)		
Asian Looking			135.550	
			(144.840)	
Attractiveness X Asian			-353.843	
			(311.146)	
Female				56.037
				(121.076)
Attractiveness X Female				-305.533
				(205.452)
Constant	62.352	189.665***	43.666	-26.499
	(144.439)	(54.658)	(145.712)	(147.443)
Observations	301	301	301	301
Adjusted R^2	0.208	0.240	0.207	0.232

Notes: Dependent variable is the number of citations. Cohort dummies and picture properties included in all regressions but not reported. Standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table A9. Robustness: OLS regression models predicting the number of citations at year 7 by attractiveness score

	(1)	(2)	(3)	(4)	(5)
Attractiveness score	308.462***	348.785***	248.498***	316.364***	1.455***
	(92.570)	(93.734)	(92.190)	(100.053)	(0.471)
Rank of PhD institution	-6.418***		-6.135***	-6.486***	-0.033***
	(1.231)		(1.214)	(1.334)	(0.006)
Rank of first job institution	-0.203**		-0.237***	-0.077	-0.003***
	(0.087)		(0.086)	(0.147)	(0.000)
Google scholar indicator	188.577***	175.030***	181.203***	210.605***	0.945***
	(39.227)	(40.504)	(39.162)	(43.617)	(0.200)
2017 Rank of PhD inst.		-20.254***			
		(3.782)			
2017 Rank of first job inst.		-0.406***			
		(0.123)			
Rank of photo institution				-0.205	
				(0.127)	
Field FE			Y		
Constant	62.352	87.890	175.057	99.801	4.512***
	(144.439)	(142.897)	(154.435)	(74.700)	(0.735)
Observations	301	281	301	273	301
Adjusted R^2	0.208	0.227	0.255	0.219	0.296

Notes: The dependent variable in columns (1)-(4) is the number of citations, and in column (5) it is the log of number of citations + 1. Cohort dummies and picture properties are included in all regressions but not reported. Standard errors are in parentheses. *p<0.10, **p<0.05, ***p<0.01.

Table A10. Hetrogeneity: Ordered logistic regression models predicting the rank of last job by attractiveness score

	(1)	(2)	(3)	(4)	(5)
	All	All	All	Men	Women
Attractiveness score	-1.356**	-1.470**	-1.152*	-1.128	-2.304*
	(0.609)	(0.632)	(0.646)	(0.795)	(1.236)
	[0.258]	[0.230]	[0.316]	[0.324]	[0.100]
Rank of PhD institution	0.013*	0.014*	0.013	0.014	0.030*
	(0.008)	(0.008)	(0.008)	(0.009)	(0.017)
Rank of first job institution	0.007***	0.007***	0.007***	0.007***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Business School		-0.726			
		(1.505)			
Attractiveness X Business		1.553			
		(2.591)			
Asian Looking			0.990		
			(0.979)		
Attractiveness X Asian			-1.548		
			(1.941)		
Observations	297	297	297	224	73
Pseudo R^2	0.048	0.049	0.049	0.052	0.072

Notes: Dependent variable is the rank of last observed job institution (academic institutions only). Cohort dummies and picture properties are included in all regressions but not reported. Cutoff estimates are omitted, but available upon request. Regression models are ordered logistic unless otherwise specified. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10 **p<0.05, ***p<0.01.

Table A11. Robustness: Ordered logistic regression models predicting the rank of last job by attractiveness score

	(1)	(2)	(3)	(4)	(5)	(6)
	baseline	2017 ranks			Probit	OLS
Attractiveness score	-1.356**	-1.279**	-1.212*	-1.154*	-0.784**	-126.032**
	(0.609)	(0.603)	(0.621)	(0.609)	(0.346)	(55.579)
	[0.258]	[0.278]	[0.298]	[0.315]	[0.456]	
Rank of PhD institution	0.013*		0.013	0.013	0.010**	0.379
	(0.008)		(0.008)	(0.008)	(0.005)	(0.761)
Rank of first job institution	0.007***		0.007***	0.000	0.003***	0.602***
	(0.001)		(0.001)	(0.001)	(0.000)	(0.053)
2017 Rank of PhD inst.		0.050**				
		(0.025)				
2017 Rank of first job inst.		0.010***				
		(0.001)				
Rank of photo institution				0.018***		
				(0.002)		
Field FE			Y			
Constant						140.257
						(87.291)
Observations	297	299	297	276	297	297
Pseudo R^2	0.048	0.058	0.053	0.124	0.042	
Adjusted R^2						0.325

Notes: Dependent variable is the rank of last observed job institution (academic institutions only). Cohort dummies and picture properties are included in all regressions but not reported. Cutoff estimates are omitted, but available upon request. Regression models are ordered logistic unless otherwise specified. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.

Table A12. Robustness: Ordered logistic regression models predicting the rank of last job by attractiveness score

	(1)	(2)	(3)	(4)
Attractiveness score	-1.356**			
	(0.609)			
	[0.258]			
Rank of PhD institution	0.013*	0.013*	0.013*	0.013*
	(0.008)	(0.008)	(0.008)	(0.008)
Rank of first job institution	0.007***	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)
Attractiveness (by male raters)		-1.288**		
		(0.564)		
		[0.276]		
Attractiveness (by female raters)			-1.008*	
			(0.558)	
			[0.365]	
Attractiveness (by reliable raters)				-1.284**
				(0.581)
				[0.277]
Observations	297	296	297	297
Pseudo R^2	0.048	0.048	0.048	0.048

Notes: Dependent variable is the rank of last observed job institution (academic institutions only). Cohort dummies and picture properties are included in all regressions but not reported. Cutoff estimates are omitted, but available upon request. Standard errors are in parentheses. In square brackets we report coefficients in exponential form with 1 indicating no effect. *p<0.10, **p<0.05, ***p<0.01.