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Productivity or Discrimination?

Beauty and the Exams

by

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Productivity or Discrimination? Beauty and the Exams[1]

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Abstract

Do good looks make people more productive? An impact of looks on earnings has been found in the empirical literature: plain people earn less than average-looking people who earn less than the good-looking. However, an important question remains unanswered: is the impact of beauty due to pure discrimination or productivity? We provide evidence against the hypothesis of Becker-type discrimination stemming from tastes and in favor of productivity-related discrimination.

JEL: J71; I20.

Keywords: Physical appearance; discrimination; productivity.

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I. Introduction

Following on the seminal paper by Becker (1957) on discrimination, there has been a vast empirical literature measuring differences in earnings or other labor markets outcomes between different groups of workers. The impact of appearance on wages is now quite well documented. For instance, weight seems to be affecting mainly female wages, with a wage penalty for obese women (Averett and Korenman, 1996). Persico *et al*. (2004) explain the origin of the "height premium", i.e., the increase in wage that goes with an additional inch of height, and find that it is the height at teens age that essentially determines the returns to height.

Recent research has studied how physical appearance, i.e., beauty, affects labor markets outcomes. However, this task is usually complicated by the fact that different groups may have different productivities. Hamermesh and Biddle (H&B, 1994) and Biddle and Hamermesh (1998) found evidence that beauty affects earnings irrespective of gender. They also found that the labor market sorts the best-looking people into occupations where looks are likely to be more important (hence productive), but this latter evidence is rather weak. Using physical appearance as a possible source of discrimination makes it easier to distinguish labor-market outcomes arising from discrimination against a group (the homely in this case) from those produced by unobserved productivity. In fact, it can be argued that there are activities in which appearance is more important and where the payoff to beauty then reflects productivity, and other jobs where any such payoff reflects pure discrimination.

Similarly, for the UK labor market, Harper (2000) found that physical appearance has a substantial effect on earnings. He also found that beauty has a very significant impact in the marriage market. However all these studies, like many others on the effects of various ascriptive characteristics on wages, find it difficult to distinguish whether the wage differential is due to Becker-type discrimination stemming from tastes or to differences in productivity. Indeed, ".. it is very difficult to construct a research design that allows one to distinguish labor-market outcomes arising from discrimination against a group from those produced by intergroup differences in unobserved (by the researcher) productivity.." (H&B, 1994: 1175).

In an attempt to disentangle these effects, a recent paper by Pfann *et al*. (2000) on a sample of Dutch advertising firms finds that those with better-looking executives have higher revenues and hence pay them more. However, the fact that beauty is highly

productive in the advertising sector may not come as a surprise. Another paper by Hamermesh and Parker (H&P, 2003) shows that lecturers who are viewed as better looking receive higher instructional ratings by their students. Then, *ceteris paribus*, these higher ratings translate into higher salaries, because US university administrators pay attention also to teaching quality in setting salaries. However, the question remains on whether students are simply discriminating against ugly professors by reacting to an irrelevant characteristic, or if they do really learn less from them. And again, more generally, "... disentangling the effects of differential outcomes resulting from productivity differences and those resulting from discrimination is extremely difficult in all cases …" (H&P, 2003: 12).

This paper is a contribution to the debate on whether the labor market outcome of ascriptive characteristics represents productivity or discrimination. Using a rich set of data from the College of Economics at the University of XX, we examine the effects of students' physical appearance on examination results. We find evidence that beauty has a significant impact on academic performance, a result which is consistent with and comparable to the impact found in the labor market literature. In addition, since we can compare student performances in oral and written exams, where in the latter the evaluation is blind, i.e., not influenced by physical appearance, we can in fact understand better the source of the "beauty premium", that is disentangle productivity from discrimination effects. We find that the effect of beauty on academic performance cannot be ascribed to pure professor discrimination. One could then argue that to the extent that wages rise with educational attainments, our findings corroborate the hypothesis that the payoffs to beauty reflect differences in productivity.

The paper is organized as follows. Section II describes the working of university system for students in Italy and the dataset that we use to analyze the role of looks. Section III presents the main empirical results of the paper, first showing the impact of beauty on students' performance and then disentangling the discrimination and productivity effects. Section IV briefly discusses some possible explanations based on psychological and economic theories which help to interpret our results. Section V concludes the paper.

II. Data and institutional details

In the 2001-2002 academic year, a substantial reform of university degrees took place in Italy. In order to make university education more suitable for the job market and to improve on graduation rates,[2] the official duration of undergraduate degrees was reduced from 4 to 3 years. According to the Ministry of University, this would make the Italian university degrees (*Laurea*) more comparable with analogous degrees in other European countries, as agreed with the Bologna Convention among EU Education Ministers. In addition, in the new system more motivated students can further acquire education by adding 2 more years to obtain a specialized degree, the *Laurea Specialistica*, and then enter into PhD programs.

Students enrolled at the College of Economics at the University of XX, like those in most Italian universities, are offered two types of examinations, verbal or written. Each professor is free to choose whether to set an oral or a written exam. In some cases the exam is both oral and written, but only a final mark (sometimes the average, some other times other combinations) is recorded. In addition, in Italian universities students are allowed to take examinations many times during the academic year, and it may happen that a student attending a class can take the exam either at the end of the course or in other dates during the following months or even years. Therefore there is more than one examination session in the academic year and in each session a student can take (almost) as many exams as he/she likes.

In the period under consideration, in the College of Economics there were 3 sessions every year. The Winter session, held in January and February, was about 8 week long, and the exams for each course were delivered at three different dates, at least two-week apart; the Summer session, in June and July, about 7-8 week long, in which again for each course students had the opportunity to take exams three times; and the Fall session, shorter (3 weeks), in which exams were delivered only one or at most two times per course. Therefore, every year students had the opportunity to find 7 to 8 dates at which to take the exams for each course.

The exam evaluation and grading is based on grades with a scale going from 0 to 30 (with 30 *cum laude* being awarded in some cases) and the pass threshold set at 18. However no mark is ever recorded when below 18. If students fail an exam, i.e., they get a grade below 18, there is no official record of the event (nor even that they have attempted), and they can take the exam again some other time. When marks are released, but before they

[2] In Italian universities, on average, the drop out rate under the old system was 60%. The average time spent to complete a first degree was 7 years and only 4.6% of students graduated on time. With the new system of three-year degrees provisional results show that 41% of students graduate on time, that is within 3.5 years (Istat, 2005).

are recorded, students can refuse to register the mark in order to re-take the exam in the future and perhaps get a higher mark. In this case, again, there is no record of the first attempt. Finally, there is no upper limit on the number of years students can take to finish their degree. In order to graduate, however, a student has to pass a certain number of exams.[3] Moreover, the final grade coming with the awarded degree is calculated on the basis of the simple average of grades obtained during the academic career.

Table 1 presents the statistics describing our variables. We have collected data on the cohort of students at the College of Economics at the University of XX registered for their first time in the academic year 2001-2002, observed over three years. There are 885 students in the dataset, 51.4% of which are female. In our dataset we have data on the type of high school they attended, on the high school final grades, the date of birth, and the home address. We also obtained detailed information about each student's academic curriculum with examination dates and marks. Our dataset records all individual grades up to the 2004 summer session. In theory, since the official duration of their course was 3 years, by that session any student in our cohort could have graduated. However, a negligible number of students - only 10 - did actually graduate. Some students will have graduated over the following months, and many more will graduate in 2005 and later years, when they complete all the required exams. Quite a lot of them, however, will never graduate.

[Insert table 1 about here]

For each student, photo-id pictures were also available. Each of the student's pictures was rated by each of five professors: 2 women and 3 men aged respectively 35, 58, 40, 45, 62 (to accord with the age and sex distribution of university professors in the College). The raters viewed all photographs on a high resolution computer screen, one by one, and could tick beauty on a 5 (highest) to 1 rating scale.[4] Of course, the ideal measure of beauty would account for all of a person's features capable of making a visual impact on the observer and not just the facial features. However, the error this may introduce in the beauty measure is unlikely to be systematically related to any of the variables we focus on. Also, Jackson (1992) has shown that there is a high correlation between responses to still photographs and responses to video tapes of the same stimulus person. Finally, the cited literature on the economics of beauty has always used still photographs.

[3] In the years under consideration, the required number of courses and hence exams was 37.

[4] They were instructed to use 3 for average look, 4 and 2 for respectively better and worse than average, 5 and 1 for respectively the beautiful or handsome and the homely. They were allowed to move back to previously rated photographs to change or check their ratings.

In a series of pair-wise correlations, we found correlations from 0.42 to 0.58 between panel members, always highly significant, and given the number of pictures this seems to suggest a substantial agreement among evaluators about the appearance of individuals, thus confirming the existence of common standards of beauty, as found in the rest of the literature. For the beauty index we will use, however, we standardized each rater's evaluation and then created a composite standardized beauty measure for each student by summing the five standardized ratings.

III. Looks and the Exams

The tuition fees for public universities in Italy are rather low,[5] and thus it is quite common that many students are enrolled at university without actually taking exams. In our cohort about 27% of the students have not passed a single exam. These may be students who have never *taken* an exam, for example because they enrolled just out of high school while looking for a job and then found one, or they may be students who have never *passed* an exam despite attempting. Although, as already explained, we do not have official university records of students' failed attempts, evidence collected from colleagues teaching first year courses suggest that about 30% to 50% of students fail each time. This seems to suggest that a large portion of "non participating", i.e., not taking exams, students are actually participating but do fail.

An important aspect of this study is to investigate the effect, if any, of the physical appearance on the performance of students. Hence, we consider the impact of beauty on an indicator of performance that takes into account both the number and the grades of the passed exams using a series of regressions that we present in the next section. In addition, in the sections that follow, we further investigate this issue by looking at the effects on the number of exams and on the average grade obtained separately, plus some other variables that allow us to distinguish between the impact of beauty due to discrimination and productivity. Preliminary to our analysis we run a probit regression on the participation of students, i.e., having or not passed any exam. The result show that whether or not exams are taken is dependent upon beauty. [6] Therefore, using OLS on the number of exams taken only for those students for whom this number is positive gives downwards biased results.

[5] About 1000 euro per year at the university under consideration, with similar levels for other Italian public universities as well.

Also, the number of exams, as well as our index of performace described in the next Section, are censored variables where observations are clustered at a lower threshold (zero or eighteen) since no mark is ever recorded below the pass mark. Since in principle marks could take on values below eighteen but we do not observe them because of censoring, we employ Tobit estimates using all students in the sample.

III.1 Evidence of the "beauty premium"

As a primary **index of performance** we use a composite index of the number of exams times the average grade, which is equivalent to the cumulative sum of the grades of the exams passed by the student (Checchi and Pravettoni, 2003):

$$perf_i = n_i \cdot \overline{g}_i = n_i \cdot \left(\frac{1}{n_i} \cdot \sum_{j=1}^{n} g_{ij} \right) = \sum_{j=1}^{n} g_{ij},$$

where n_i is the number of exams passed by student i, $\overline{g}_i$ is the average grade, and g_{ij} is the grade obtained in the *j-th* exam.

Notice that Italian students need to pass successfully a given number of exams before being awarded their *Laurea*. The final grade however is proportional to the grades obtained in all the exams during the academic career and hence a student trying to finish her studies in a shorter time may be able to do it at the expense of a lower average and hence final grade. Since we are considering the records of each student taken at the end of their third year, our composite index takes into account both the ability to be fast, i.e., to do a greater number of exams and hence to finish earlier, and to have good grades.

At this stage we are interested on whether physical appearance has an impact on performance and hence we estimate the following:

$$\log perf_i = \beta X_i + \gamma b_i + \varepsilon_i,$$

where $\boldsymbol{X}_i$ is a vector of student i's characteristics and b_i is the student's index of physical attractiveness. As explained before, since all performances below 18 (one exam times the lowest recorded mark of 18) are not registered, we need to employ Tobit estimation of students' performance on their set of characteristics to take truncation into account.

According to our results (table 2), better looking students perform better in the exams: the coefficient is positive and highly significant (at 1%). Moving from one standard

[6] Estimates are available from the authors upon request.

deviation below the mean to one standard deviation above leads to an increase in the performance of about 38%. Hence there appears to be evidence that beauty – as already found in labor markets, where it affects wages – can affect performance. In addition, the magnitude seems comparable to what is found in labor market studies. For instance, H&B (1994), using data from North-America, found pay premium for above average looking people of about 1-13% and pay penalties for below average looking people of 1-15%, according to the available dataset. Harper (2000), using UK data, found a pay penalty ranging from 4% to 14.9% for unattractive men and around 10.9% for unattractive women.

[Insert table 2 about here]

Before testing for the robustness of this result, however, we look also at the effect of other characteristics on students' performances. Being just out of high school (year_82), on the other hand, increases the probability of doing better at university. This effect may be related to the fact that these students are in a sense just "minted" (fresh of studies) and hence may find it easier to pass exams. Alternatively, and more likely, these students in fact do not participate yet in the labor market, and hence their opportunity cost of studying may be lower than part-time students, i.e., those that have already a job. In other words, these students may have acquired and not yet forgotten the right skills to succeed in school, or more likely, fresh graduates may have fewer occupation opportunities[7] and hence may happen to be full-time students and be less distracted by work duties from their academic career.

A similar effect is related to the type of high school the students were enrolled before going to university. It appears that students who attended a "liceo", i.e., a high school that gives a general purpose education, either in the humanities, sciences, liberal arts, or languages, are better performers than student coming from professional schools. Indeed, professional schools are known for being less demanding on their students while the curriculum is more rigorous and demanding in a *liceo*. Technical schools are more demanding than a professional school and less than *liceo*, however the corresponding dummy variable is not significantly different from zero.

The students coming from *liceo* have probably fewer opportunities in the labor market in the short run, at least compared to students graduated from technical or professional high schools, and hence their opportunity cost of studying may be implicitly lower. Although we would need to have more information, for instance on family background, to explain

[7] In the North-East of Italy, the unemployment rate is quite low (about 3.5%), even among young people (9.8% for 15-24 and only 4.1% for 25-24 year old).

educational choices and students' performances, notice that the type of high school chosen is in fact related to family background, especially income levels and parents occupation and class, e.g., working or middle class. Middle class families, indeed, tend to send their children to *liceo*, known for being better equipped to prepare students for Universities, where they expect their children will go after high school. On the other hand, working class families may prefer technical schools, known for providing an education better suited for the job market after school. In other words, the choice of the type of schools may reflect, to some extent, the family economic and educational background.

Given the same family background, moreover, the choice of the type of school may reflect sorting of students based on their educational abilities: other things equal, students going to professional schools may be expected to be less performing on educational matters. For this reason, the choice of the type of school attended may also partially pick up students' ability. A better proxy for student ability, however, is the final grade, i.e., the graduation grade, from high school. As one would expect, its impact is positive and highly significant on students' performances. To the extent that this grade reflects students' abilities, one can conclude that the more able students coming out of high school also perform better at university.

Another variable that significantly affects students' performance is the final grade obtained in the State exams at the end of high school. This variable is very likely related to students' ability and it is not surprising to find a significant effect, which is also the biggest in magnitude among the variables used in these regressions. We also considered a dummy variable (eci) for those students enrolled within the same College but in a degree program managed in a nearby city. This degree program differs in terms of facilities (there are less) and, in part, teaching faculty (more junior, part-time or temporary). The dummy is always significant and positive in this and all the subsequent estimates, meaning either that students enrolled in this program have better abilities or, more likely, that exams there may be relatively easier to pass.

The dummy for gender is not significant. However, when estimating separate regressions for males and females, we find a positive and significant effect of beauty only for males, confirming what is found in the labor markets literature. Looking at other regressor, characteristic that has an impact on performance but only for males and at the 10% level, is the fact that the student is resident in the area where the course is offered (resident). If we believe that a student who decides to enroll into a course offered in her own town (Province in our case) may be less motivated than a student who decides to

enroll into a course in another city, we have to expect that the resident student may have lower performances. As can be seen from table 2, the coefficient is indeed negative.

It is interesting to investigate on whether there is a premium for being handsome or a penalty for being homely and if these two effects are in fact symmetrical. In the literature indeed there have been different findings. H&B (1994), analyzing US data and estimating human capital-type earnings equations, found that penalty for unattractive people were greater than premiums for attractive people. The same authors, using Canadian data, however found that premium were larger than penalties, with these latter being insignificant. Harper (2000), using data from the UK job market, found a larger penalty for unattractiveness than H&B (1994).

We construct a dummy (handsome) for the top 30% most beautiful students and another (homely) for the bottom 30% least beautiful students and estimate separate regressions for males and females. As it appears from the last two columns of table 3, there is a significant penalty for being homely for male students since being in the bottom 30% reduces our index of performance to 9% below the average. On the other hand, the premium is small and insignificant for males and only significant at 10% for female students.

In summary, we have shown that physical appearance has a significant and economically meaningful effect on the performance of students. First of all, being handsome increases the probability that a student in fact takes and pass exams. Second, and more important for us, better looking students have better performances than other students. Last, we find that the premium for beauty is smaller than the penalty for ugliness. While less economically important than the effects of the proxies for education and ability, these impacts seem quite significant, as already observed in the literature on labor market outcomes. We now turn to investigating on whether the increase in performance is related to different students' productivity or to discrimination.

III.2 It's not discrimination, is it?

In this section we wish to determine whether the effect of beauty on student's performance is the result of unobserved productivity or of pure discrimination by professors. If we can reject pure discrimination, one can safely assume that the effects of beauty on performance may be explained by different students' productivity.

To investigate the presence of pure discrimination effects we proceed in different steps. First, as a preliminary check, we look at the effects of beauty separately on the average grade and on the number of exams passed. While the discrimination effect of beauty may be at work in obtaining higher grades – teachers could be influenced by physical appearance when they can actually see it – it is less clear how it would influence the number of exams passed. The number of exams taken and passed is more the result of students' choices and effort, and so could perhaps reflect more productivity than discrimination.

Second, we exploit the type of examination – either oral or written – to disentangle the effect of beauty. Given that in written examinations physical appearance is unnoticed, our dataset should allow us to see if there is some support to the hypothesis of pure discrimination. If look had a (positive) impact on oral exams grades but were unimportant in written exams, then we could start asking whether these different effects where due to discrimination or whether the *type* of examination, in the case of the oral exam, was such to disadvantage homely people who may just be less confident and under perform in an oral exam.

An important variable in our dataset is thus the **number of exams** that each student has taken in the period under consideration (almost 3 years). As explained in the previous section II, this is partly a choice variable, partly the result of students' effort and ability, in the sense that students graduate when they have passed a given number of exams, but there is no lower limit on the number of exams that must be taken each year and a student is allowed to stay enrolled for as many years as he chooses to. Again, since students may in fact have taken exams but not passed them, we need to use Tobit analysis. We then estimate the following equation:

$$n_i = \beta X_i + \gamma b_i + \varepsilon_i,$$

and table 3 reports the results of the Tobit estimations of the number of exams passed (n_i) on different students characteristics. Physical appearance is significant, like other variables such as the dummies for the type of high school completed, being just out of high school, and not being resident at the university's location, confirming again the results found for the composite performance index.

The dummy for being a male student is not significant in explaining students' performances in terms of number of exams. However, performing separate regression for each gender, we find that physical appearance is significant only for male students. Moving from one standard deviation below the mean to one standard deviation above increases the

number of exams passed by about 25% with respect to the mean. This result confirms the impact of beauty on the composite index of performance already seen before, both in significance and in the order of magnitude. The number of exams passed in the interval considered is a clear measure of productivity and thus we believe this is a first signal that beauty has a productivity effect.

The other variable related to performance that we employ is the exams average grade and thus we estimate the following:

$$\overline{g}_i = \beta X_i + \gamma b_i + \varepsilon_i,$$

where $\overline{g}_i$ is the **average grade**, obtained in the exams. This measure of performance is censored too. Indeed, the grades are on a scale between 0 and 30, but in order to pass an exam the minimum grade is 18, and it is a general practice that only the grades equal or above 18 are registered, while in case of failing the exams, i.e., grades below 18, these are censored. To control for this we use a Tobit regression model. As before, beauty does not seem to have any significant effect for females, while it is significantly different from zero for males even though its impact is not high. The dummies for the type of high school attended before enrolling at university plus the final high school grade are also significant.

Following the second path in our investigation, we look at the, possibly differential, impact of beauty on written and oral examinations. In the years under consideration, 37 exams were to be passed in order to graduate and obtain the Laurea. However, the average number of exams passed by active students, i.e., those who took at least one exam, was just below 18, and only ten students actually finished all the exams and graduated. Thus, even though the type of exam for each course – either written or oral – is a choice of the professor, which exams to take first is decided by the student.

In table 4 we report the results of Tobit regressions on the **number of written and oral exams** respectively. The impact of beauty for males appears to be positive for both type of exams, but more important for written examinations where an identical increase in beauty increase almost twice as much the number of exams. If we believe in a pure discrimination effect of beauty, we would expect, if any, that handsome students would take more oral exams, where their beauty could be appreciated. Since we find the opposite result, i.e., that beauty has more of an impact on the number of written exams, we believe this gives more support to the productivity hypothesis and less to the pure discrimination hypothesis.

Looking at the **average grades for written and oral exams,** in table 5, we find that the beauty coefficient is significant for both oral and written exams average grades. Again the

effect is stronger on written exams.[8] We believe that if beauty had a pure discrimination effect, we should find a greater impact of beauty on the oral exams average grades, which we do not. Again, the (lack of) evidence in this last set of regressions appears to be more consistent with a productivity effect of beauty.

We also investigate whether beauty has any impact on students' **differences in performances** between oral and written exams by estimating the following:

$$\Delta perf_i = \beta X_i + \gamma b_i + \varepsilon_i,$$

where $\Delta perf_i$ is the difference in performance between oral and written exams. The performances in this case are measured in terms of average grades and number of exams, as we will describe shortly. In general, if we believe in the pure discrimination effect of beauty, we should expect a better performance of good looking students in oral exams, especially in terms of average grades. In other words, if students show better performances in oral exams and beauty is found to have a positive and significant impact on it, i.e., $\gamma > 0$, there would be some evidence of discrimination.

In table 6 we report the results of an OLS regression on the differences between the average grades obtained in oral and written exams on the usual explanatory variables. Beauty's coefficient is not significantly different from zero, as almost all other explanatory variables.

In the same table, we also look at the impact of beauty on the difference between the number of oral and written exams passed by the students. To be consistent with a discrimination type of explanation for the effects of beauty on performances, we would expect $\gamma > 0$, i.e., more handsome people doing more oral exams. Instead, we find that when there is an effect of beauty, in the regression for males, this is in fact negative, meaning that better looking students have passed more written exams. Again, if any, we believe that this evidence would be consistent with a productivity effect of beauty.

To summarize, we believe that we have evidence that allows us to reject the pure discrimination effect of beauty on performance. Instead, given that in our dataset beauty does in fact affect students' performances at university, we argue that we can opt for a productivity type of explanation: more handsome students are also more productive. We explore possible explanations for this result in the following section.

[8] Incidentally, this result seems to provide support to the theory that society has higher expectations on the performance of beautiful people compared to the rest. Given these expectations, an average performance by

IV. Discussion: Why is better looking also smarter?

This research has found a relationship between attractiveness and an index of performance. The motivation of our study was the economic literature on beauty and the labour market and its startling result that looks have a clear impact on earnings. An important unanswered question in the literature is asked directly by Daniel S. Hamermesh when he describes his research on the *Economics of Beauty*: "Do good looks make people more productive – can we ever distinguish between the effects of beauty, or some other characteristic, as discrimination or productivity?".[9]

By distinguishing between oral exams (where beauty is observed) and written exams (where it is not), this paper has not found any direct evidence for discrimination, a result similar to experimental economics evidence that ruled out any Becker-type discrimination effect (Mobius and Rosenblat, 2004). Thus our evidence suggests that good looks could make people more productive. In this Section we will discuss some of the existing literature on the effects of facial attractiveness in order to find a possible explanation for the positive relationship between beauty and productivity, starting with the non-economic literature.

A very comprehensive review of the literature is that by Langlois *et al.* (2000) which conducts a quantitative review of the effects of facial attractiveness using hundreds of papers from published and unpublished sources from 1932 to 1999. This article concludes that: 1) Beauty is not in the eye of the beholder, i.e., contrary to conventional wisdom there is a common standard of beauty both within and across cultures. 2) People do judge a book by its cover, i.e., attractive adults and children are judged more favourably and treated more positively than unattractive adults and children, even by those who know them. 3) Beauty is not only skin deep, i.e., although both attractive and less attractive individuals exhibit positive behaviours and traits, attractive individuals tend to exhibit more positive behaviours and traits than unattractive individuals.

Another important contribution of the aforementioned paper is to discuss the various theoretical mechanisms explaining why beauty influences judgment, treatment and behaviour. In this respect, the literature distinguishes between social expectancy theories and fitness-related evolutionary theories. The first set of theories is based on the assumptions that cultural norms and experience influence the behaviour of both targets and

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them is penalized. For a discussion of these effects in a public good experiment see Andreoni and Petrie (2004).

perceivers and that social stereotypes create their own reality (like a self-fulfilling prophecy). The second set of theories posits that morphological characteristics are indicators of fitness, health, quality and reproductive value. According to this second group of theories, beauty is an important aspect in human relations which operates through channels like mate selection and differential parental solicitude. While the first channel makes no predictions regarding the importance of attractiveness for children, since they are clearly not involved in selecting a mate, the second channel could be designed to explain children's behaviour. In fact, it posits that if attractiveness is perceived as an indicator of quality, adults should invest more in attractive than unattractive children to enhance their own reproductive success.

Based on their review of the literature, Langlois *et al.* (2000) concludes that although predictions from both social expectancy and fitness-related evolutionary theories are partially supported, neither theory is totally successful in predicting the various findings, and much additional research is needed before we can find how and why facial attractiveness influences social behaviour and development.

Recent economic literature recognizes the growing consensus that physical attributes, e.g., beauty and height, can affect the acquisition of non-cognitive skills. These latter represent a form of human capital and contribute substantially to labor market success. Heckman (2000), for instance, reports evidence that preschool programs improve students' social skills and motivation and hence can raise lifetime earnings. Persico *et al*. (2004) found that about half of the "height premium" in the labor market can be accounted for by variation in participation in school sponsored non academic activities. Being tall as an adolescent, they conclude, facilitates the acquisition of some form of human capital, like social adaptability, confidence and the ability to interact socially with others.

In a recent paper, Mobius and Rosenblat (2004) report the results of an experimental labor market study decomposing the beauty premium and identifying three channels through which physical attractiveness can raise an employer's estimate of a worker's ability. Since the confidence channel influences workers' beliefs, they show that better looking workers are substantially more self-confident. Their paper is thus consistent with the psychological and economic research and the anecdotal evidence emphasizing that "... people do recognize the income-enhancing effects of confidence ..." and thus "... the need for positive-thinking and for self-esteem as one key to success ..." (Mobius and Rosenblat, 2004: 6).

[9] See his homepage at http://www.eco.utexas.edu/faculty/Hamermesh/Beautyblurb.htm

In a theoretical paper, Benabou and Tirole (2002) analyze the value placed by Bayesian rational agents on self-confidence and its effects in enhancing motivation. Indeed, self-confidence is valuable to the extent that it improves the individual's motivation to undertake projects and persevere in the pursuit of her goals. Ability and effort may interact in determining performance: in most instances they are complements, and so a higher self-confidence improves the motivation to act. In addition, people have imperfect knowledge of their own skills and abilities, and standard observation shows that morale plays an important role in difficult endeavors. This recent theoretical literature thus accomplish to model the influence of behavioral traits, to be distinguished from cognitive ability, i.e., more productive skills that can be acquired through education or proper training, on earnings differentials. Indeed, as Bowles *et al.* (2001) emphasize, seemingly irrelevant characteristics such as height, beauty, obesity have a potential role as reliable predictors of earnings.

To conclude and summarize, we view these theories as important in explaining our results. If beauty has an effect on performance, and one can rule out pure Becker-type discrimination as we do, the hypothesis that good looks make people more productive finds some support in these theoretical mechanisms. Essentially the higher productivity of attractive people could be the result of pure discrimination in the past because of different parental (and teacher) solicitude or of past and current social stereotypes that affect self-esteem and motivation and hence productivity via a self-fulfilling prophecy.[10]

We view the fact that we can rule out another important possibility, i.e., that differential attractiveness can simply influence professor appraisals of students' performance though pure discrimination, as an important result of our paper. Given this perspective, one can relate our results to complement the received literature on the effects of beauty in the labour market. If differential productivity at the university translates in differential productivity at work, differences in wages arising from differences in attractiveness could also be the result of different performances. In other words, the proportion of wage differential that can be attributed to greater productivity as opposed to discrimination may be higher than what is implied by the literature.

V. Conclusions

[10] As noted by Langlois *et al.* the question of why and how stereotypes based on attractiveness originated in the first place remains unanswered.

We conduct an empirical analysis using a large dataset of students' records and find evidence of a positive impact of facial attractiveness on their performance at the university. This is in line with the results of a number of papers in the labor literature which find that workers' looks have a positive impact on their earnings. The main results of our empirical analysis are three: 1) The impact of beauty is positive and significant in the decision to participate, that is to sit and pass exams once enrolled at the university. 2) Beauty affects significantly and positively the performance of active students, i.e., students who chooses to sit exams. 3) Distinguishing between oral exams (where beauty can be observed by the professors) and written exams (where it cannot be observed) allows us to reject the hypothesis of pure Becker-type discrimination based on beauty and stemming from professorial tastes. The paper concludes with a brief discussion of the theories advanced by the psychological and economic literature to explain why attractiveness may influence productivity.

References

Andreoni, J. and R. Petrie, 2004. Beauty, Gender and Stereotypes: Evidence from Laboratory Experiments, *mimeo*, University of Wisconsin.

Averett, S. and S. Korenman, 1996. The Economic Reality of The Beauty Myth, *Journal of Human Resources*, 31, 2, 304-330.

Becker, G., 1957. *The Economics of Discrimination*, Chicago University Press, Chicago.

Benabou, R and J. Tirole, 2002. Self-confidence and Personal Motivation, *Quarterly Journal of Economics*, 117, 3, 871-915.

Biddle, J.E. and D.S. Hamermesh, 1998. Beauty, Productivity, and Discrimination: Lawyers' Looks and Lucre, *Journal of Labor Economics*, 16, 1, 172-201.

Bowles, S., H. Gintis and M. Osborne, 2001. The determinants of earnings: A Behavioral Approach, *Journal of Economic Literature*, 39, 1137-1176.

Checchi, D. and G. Pravettoni, 2003. Self–esteem and educational attainment, *Working Paper* 30.2003, Dipartimento di Economia e Politica Aziendale, University of Milano.

Hamermesh, D.S. and J.E. Biddle, 1994. Beauty and the Labor Market, *American Economic Review*, 84, 5, 1174-1194.

Hamermesh, D.S. and A.M. Parker, 2003. Beauty in the Classroom: Professors' Pulchritude and Putative Pedagogical Productivity, *NBER Working Paper Series*, #9853.

Harper, B., 2000. Beauty, Stature and the Labour Market: A British Cohort Study, *Oxford Bulletin of Economics and Statistics*, 62, 771-800.

Heckman, J.J., 2000. Policies to Foster Human Capital, *Research in Economics*, 54, 3-56.

Jackson, L.A., 1992. *Physical Appearance and Gender.* Albany, NY: State University of New York Press.

Langlois J.H., L. Kalakanis, A.J. Rubenstein, A. Larson, M. Hallam and M.Smooth, 2000. Maxims or Myths of Beauty? A Meta-Analytic and Theoretical Review, *Psychological Bulletin*, 126, 390-423.

Mobius M.M. and T.S. Rosenblat, 2004. Why Beauty Matters, *mimeo*, Wesleyan University, CT.

Persico N., A. Postlewaite and D. Silverman, 2004. The Effect of Adolescent Experience on Labor Market Outcomes: The Case of Height, *Journal of Political Economy*, 112, 5, 1019-1053.

Pfann, G.A.; Biddle, J.E.; Hamermesh, D.S. and C.M. Bosman. 2000. Business Success and Businesses' Beauty Capital, *Economics Letters*, 67, 201-207.

Table 1. Descriptive statistics

Variable	Obs.	Mean	Standard deviation	Min.	Max.
High School grade	846	0.780	0.121	0.6	1
Number of exams (>0)	644	17.669	10.759	1	37
Performance (log)	644	5.674	1.134	2.890	6.937
D number o/w	644	-0.360	2.907	-11	9
D mark o/w	507	1.672	2.122	-10	12
Beauty (standardized)	885	0	3.842	-9.523	11.145
Male	430				
Liceo	268				
Technical	508				
Professional	102				
Other	7				
Eci	235				
Resident	667				
Year_82	518				

Table 2. The impact of beauty on performance (Tobit estimates)

Variable	All	Male	Female	All	Male	Female
Beauty	0.05***	0.081***	0.014	--	--	--
	(0.016)	(0.024)	(0.023)			
Beautiful (top 30%)	--	--	--	0.261*	0.15	0.35*
				(0.15)	(0.225)	(0.199)
Homely (bottom 30%)	--	--	--	-0.263*	-0.499**	0.093
				(0.152)	(0.207)	(0.224)
Male	0.086	--	--	0.085	--	--
	(0.136)			(0.135)		
Year_82	1.407***	1.259***	1.59***	1.412***	1.246***	1.567***
	(0.135)	(0.187)	(0.195)	(0.135)	(0.187)	(0.194)
Resident	-0.061	-0.37*	0.263	-0.065	-0.347	0.266
	(0.144)	(0.209)	(0.198)	(0.144)	(0.211)	(0.198)
Technical	0.101	-0.192	0.478	0.107	-0.197	0.457
	(0.233)	(0.339)	(0.323)	(0.233)	(0.34)	(0.321)
Liceo	0.879***	0.801**	0.971***	0.881***	0.8**	0.936*
	(0.251)	(0.348)	(0.364)	(0.251)	(0.349)	(0.363)
High School grade	4.414***	4.877***	3.881***	4.449***	4.951***	3.946***
	(0.562)	(0.832)	(0.753)	(0.562)	(0.836)	(0.752)
Eci	0.515***	0.668***	0.42**	0.508***	0.653***	0.413**
	(0.14)	(0.21)	(0.187)	(0.14)	(0.21)	(0.187)
Pseudo R^2	0.082	0.096	0.073	0.082	0.095	0.075
Number obs	846	415	431	846	415	431

Robust standard errors in parentheses below the parameter estimates.

Table 3. The impact of beauty on the number of exams and on the average grade (Tobit estimates)

Variable	No. Exams			Average mark		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Beauty	0.366***	0.583***	0.111	0.077**	0.11**	0.026
	(0.125)	(0.175)	(0.179)	(0.036)	(0.051)	(0.051)
Male	0.304	--	--	-0.143	--	--
	(1.030)			(0.297)		
Year_82	10.778***	9.44***	12.478***	2.378***	2.038***	2.756***
	(1.027)	(1.36)	(1.537)	(0.295)	(0.395)	(0.437)
Resident	1.018	-3.196**	1.34	0.234	-0.244	0.794*
	(1.094)	(1.522)	(1.556)	(0.316)	(0.444)	(0.446)
Technical	1.327	0.121	3.315	0.14	-0.754	1.076
	(1.773)	(2.473)	(2.548)	(0.51)	(0.717)	(0.727)
Liceo	7.564***	7.721***	7.572***	1.981***	1.691**	2.138*
	(1.904)	(2.533)	(2.872)	(0.548)	(0.735)	(0.821)
High School	36.655***	38.528***	34.209***	11.912***	12.437***	11.078***
grade	(4.258)	(6.044)	(5.94)	(1.229)	(1.763)	(1.699)
Eci	4.298***	4.597***	4.22***	0.895***	1.061**	0.788*
	(1.063)	(1.523)	(1.475)	(0.307)	(0.444)	(0.422)
Pseudo R^2	0.049	0.059	0.042	0.059	0.07	0.049
Number obs	846	415	431	846	415	431

Robust standard errors in parentheses below the parameter estimates.

Table 4. The impact of beauty on the number of oral and written exams (Tobit estimates)

Variable	Oral Exams			Written Exams		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Beauty	0.122**	0.176*	0.06	0.2***	0.324***	0.058
	(0.053)	(0.076)	(0.074)	(0.06)	(0.085)	(0.085)
Male	0.3	--	--	0.225	--	--
	(0.435)			(0.497)		
Year_82	4.357***	4.173***	4.601***	4.869***	4.209***	5.764***
	(0.439)	(0.594)	(0.643)	(0.502)	(0.669)	(0.747)
Resident	-0.363	-1.057	0.356	-0.934*	-2.134***	0.334
	(0.46)	(0.657)	(0.645)	(0.524)	(0.732)	(0.738)
Technical	-0.044	-0.507	0.594	1.332	0.89	2.252
	(0.748)	(1.066)	(1.06)	(0.886)	(1.243)	(1.265)
Liceo	2.412***	2.426**	2.382**	4.004***	4.017***	4.268***
	(0.802)	(1.091)	(1.194)	(0.947)	(1.27)	(1.415)
High School	14.809***	15.059***	14.265***	16.919***	16.893***	16.669***
grade	(1.806)	(2.623)	(2.487)	(2.06)	(2.921)	(2.867)
Eci	1.95***	2.099***	1.859***	2.647***	2.653***	2.775***
	(0.447)	(0.655)	(0.612)	(0.511)	(0.737)	(0.701)
Pseudo R^2	0.06	0.072	0.049	0.065	0.075	0.058
Number obs	846	415	431	846	415	431

Robust standard errors in parentheses below the parameter estimates.

Table 5. The impact of beauty on the average grade of oral and written exams (Tobit estimates)

Variable	Oral Exams			Written Exams		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Beauty	0.085*	0.129*	0.026	0.126***	0.162***	0.065
	(0.046)	(0.068)	(0.065)	(0.042)	(0.061)	(0.058)
Male	-0.143	--	--	0.21	--	--
	(0.384)			(0.345)		
Year_82	3.309***	3.289***	3.393***	3.164***	2.644***	3.83***
	(0.384)	(0.533)	(0.555)	(0.348)	(0.478)	(0.505)
Resident	0.035	-0.635	0.728	0.096	-0.831	1.028**
	(0.407)	(0.59)	(0.562)	(0.365)	(0.526)	(0.503)
Technical	-0.202	-1.297	0.96	0.962	0.427	1.69**
	(0.659)	(0.953)	(0.921)	(0.614)	(0.884)	(0.859)
Liceo	2.034***	1.36	2.664**	2.839***	2.463***	3.374***
	(0.708)	(0.976)	(1.038)	(0.657)	(0.905)	(0.96)
High School	14.492***	14.163***	14.422***	13.390***	13.887***	12.937***
grade	(1.594)	(2.357)	(2.16)	(1.431)	(2.095)	(1.945)
Eci	1.463***	1.598***	1.397***	1.39***	1.412***	1.46***
	(0.395)	(0.59)	(0.532)	(0.355)	(0.529)	(0.476)
Pseudo R^2	0.058	0.066	0.049	0.069	0.072	0.069
Number obs	846	415	431	846	415	431

Robust standard errors in parentheses below the parameter estimates.

Table 6. The impact of beauty on individual differences in performances (OLS estimates)

Variable	D grade o/w			D number o/w		
	All	**Male**	**Female**	**All**	**Male**	**Female**
Beauty	-0.004	0.016	-0.021	-0.046	-0.102**	0.016
	(0.026)	(0.04)	(0.031)	(0.031)	(0.048)	(0.041)
Male	-0.237	--	--	0.231	--	--
	(0.201)			(0.256)		
Year_82	0.301	0.593*	0.016	0.012	0.308	-0.463
	(0.22)	(0.338)	(0.29)	(0.268)	(0.395)	(0.36)
Resident	-0.054	0.351	-0.372	0.637**	1.14**	0.137
	(0.246)	(0.336)	(0.348)	(0.281)	(0.459)	(0.339)
Technical	0.178	-0.21	0.424	-0.718	-0.824	-0.95**
	(0.488)	(0.72)	(0.675)	(0.479)	(0.854)	(0.435)
Liceo	0.442	0.273	0.392	-0.647	-0.656	-0.967*
	(0.503)	(0.722)	(0.719)	(0.514)	(0.857)	(0.518)
High School	-0.315	-1.427	0.299	-0.946	-0.642	-1.224
grade	(0.899)	(1.516)	(1.13)	(0.983)	(1.58)	(1.227)
Eci	-0.863***	-1.35***	-0.501**	-0.84***	-0.943**	-0.92***
	(0.215)	(0.377)	(0.248)	(0.229)	(0.379)	(0.286)
R^2	0.049	0.111	0.028	0.039	0.053	0.043
Number obs	494	224	224	621	295	326

Robust standard errors in parentheses below the parameter estimates.