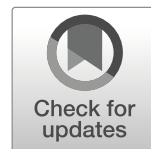


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# Weight-Based Discrimination in the Italian Labor Market: an Analysis of the Interaction with Gender and Ethnicity

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## Abstract

Access to the Italian job market is undermined by several kinds of discrimination influencing the opportunities for individuals to obtain a job. In this study, we analyze together the impact of three of the most relevant kinds of discrimination operating in the Italian labor market: gender, race, and weight. Our aim is to assess whether gender and race either increase or decrease the impact of weight-based discrimination. In this respect, we submit a set of fictitious résumés including photos of either obese or thin applicants in response to real online job offers. Our results indicate that the strongest kind of discrimination operating in the Italian labor market is the one connected to the candidate's geographical origin. Moreover, we find discrimination based on body weight to be more relevant within immigrants than within natives, and gender gap appears to be higher within the obese candidates' group compared to the normal-weight candidates' one. This last result is particularly relevant, as the growing rates of obesity forecasted for the next years could in turn produce an increase in the gender gap, which in Italy is already massive.

**Keywords** Correspondence test · Employment discrimination · Economics of ethnic minorities · Hiring process · Body weight · Obesity

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## 1 Introduction

The stereotype of overweight people concerns personality traits and behaviors which distinguish them from normal-weight individuals. On the one hand, they are commonly considered to be lazy, greedy, and selfish; on the other, they are perceived to be fun, loving, generous, and trustworthy (Galper and Weiss 1975). The existence of this stereotype is confirmed by anecdotal reports and casual observation, even if its nature remains empirically vague (Larkin and Pines 1979).

Studying the reasons underlying discrimination against overweight people is of great interest, especially with regard to the labor market, with all the social and economic implications that this entails. Following the results obtained by Larkin and Pines (1979), overweight individuals are considered to be significantly less desirable employees, being them perceived as less competent, less productive, not industrious, disorganized, indecisive, inactive and less successful.

Most of the early studies on obesity use BMI (Body Mass Index) to determine whether the labor market penalties for obesity are due to discrimination or health-related reasons. The problem with this kind of measure concerns the impossibility to distinguish between fat and fat-free mass (Burkhauser and Cawley 2008). For this reason, some scholars (e.g., Johansson et al. 2009) have started to use fat mass and waist circumference, instead of BMI, as a proxy for obesity. The two indicators are closely related: while the first one measures the amount of fat mass, the second one considers the proportion of fat mass concentrated around the waist relative to the rest of the body. This is because the fat concentrated around the waist is more visible. Following the idea of using a characteristic which is extremely visible, in line with previous papers such as Agerström and Rooth (2011), Lundborg et al. (2010), and Rooth (2009), we decided to perform correspondence testing, electronically manipulating thin candidates' photos in order to make them fat-looking. Differently from previous papers using the same method, we decided to send the profile of the same person twice, obese and normal-weight versions, only changing the picture's background and the candidate's expression. In line with comments from the past literature, this is the "ideal design for this experiment", because "using this design, any differential treatment by employers would be due solely to the weight manipulation of the photo" (Rooth 2009, p. 230). Previous papers did not use this experimental design, maybe because this strategy is thought to be "not possible to implement empirically without employers being suspicious" (Rooth 2009, p. 230), as the presence of two candidates with equivalent profile and different weight could make recruiters discard both applications. Nevertheless, as we found extremely different call-back rates in between fat and normal-weight versions of the CVs, we are quite confident that employers were not suspicious.

Recently, the problem of obesity has become increasingly relevant in quantitative terms. In 2014, over 650 million adults – about 13% of the world's adult population – were obese (WHO 2014). In the last 30 years, obesity has become a relevant problem not only for developed countries, but also for developing ones (Finucane et al. 2011; WHO 2011), and obesity rates have nearly doubled in most countries in Europe (WHO 2011; OECD 2010).

Moreover, research on the influence of weight on career-related outcomes shows that weight-based discrimination is likely to become an increasingly significant problem internationally (Ding and Stillman 2005).

While women are more likely to be obese than men (WHO 2014), Italy was the only country in Europe where average weights for women decreased between 1980 and 2008 (Finucane et al. 2011).

OECD's Obesity Update 2017 reports that, in Italy, about 9.8% of the adult population was obese in 2015, with men having a higher obesity rate than women. This puts Italy among the countries with the lowest obesity rates in the world. In the OECD area, 19.5% of the adult population was obese, with women having a higher obesity rate than men. Projections show obesity is going to increase worldwide in the near future; in Italy, the increase will be weak compared to most other countries. OECD projections put Italian obesity rate at 13% in 2030 (OECD 2017).

We want to study discrimination against obese people in Italy. Even if the country is characterized by one of the slimmest adult populations in Europe (OECD 2017), Italy is experiencing a strong increase in the portion of obese people, especially in between children age (Nardone et al. 2016). Thus, we consider that it will be a particularly relevant problem for the next years and, for this reason, very important to study. Moreover, as Italy has always been the country of fashion, great attention is devoted to physical appearance. For this reason, we think that weight-based discrimination must necessarily be a relevant topic, which can affect every aspect of obese people's everyday life, including labor market outcomes.

Surprisingly, considering that obesity is a major issue in every developed country, literature has devoted much less attention to the weight bias in the job market, compared to race and gender discrimination (Agerström and Rooth 2011).

Carr and Friedman (2005) analyzed the potential role of race and gender in reducing the relationship between body weight and employment discrimination. In their study, the influence of weight on perceived employment discrimination is examined and compared with the potential reduction of such discrimination depending on the candidate's sex and race. The two authors found that the influence of weight in the hiring process was not weakened by either race or sex.

In line with this, we compare weight-based labor market discrimination with two other types of discrimination: against women, and against immigrants. Indeed, according to Roehling et al. (2007), these are among the most frequently discriminated categories in the job market. Comparing these three kinds of discrimination is also useful to evaluate whether discrimination based on weight has already become worrying. To this end, we collected data by means of an ad-hoc field experiment, sending fictitious online CVs using normal-weight and obese, male and female, and native and immigrant candidates, in order to simultaneously evaluate the impact of race, gender and weight discrimination on candidates' probability of obtaining a job interview.

The rest of the paper is organized as follows. In Section 2 we provide a short review of the literature. The experimental design is described in Section 3. Data and first results are presented in Section 4, while Section 5 contains the empirical results from the model. Section 6 concludes.

## 2 The Weight Bias

Obesity represents a growing medical and public health cost (Wyatt et al. 2006), as it is significantly associated with several health problems and higher mortality in general (Allison et al. 1999; Mokdad et al. 2003). Moreover, increasing obesity rates could reverse life expectancy growth in some countries (Visscher and Seidell 2001). In the job market, higher healthcare and related costs can be faced up by employers when dealing with obese workers (Zablocki 1998), also as a consequence of their premature mortality (McCormick and Stone 2007).

Social disparities in obesity are strong, especially among women. The least educated women in Italy are over four times likely to be obese compared to the most educated ones (Devaux and Sassi 2011). Deprived areas are also associated with higher obesity rates, as is the case for the southern part of Italy compared to the rest of the country (Gallus et al. 2013). Since poorer people tend to consume cheaper, more fattening foods, they tend to be obese with a higher probability than richer ones (Cawley 2004). In this way, discrimination based on weight tends to increase socio-economic inequalities.

Obese people are less likely to be employed and have poorer job prospects compared to normal-weight people (OECD 2016); they experience discrimination at every stage of the employment cycle, already starting from the hiring process (Caliendo and Gehrsitz 2016). Indeed, they have a lower probability of being hired when showing up at job interviews, and this is particularly true in the case of front office jobs and for female applicants (Larkin and Pines 1979; Pingitore et al. 1994). Thus, obese women are more likely to work as self-employed rather than as employees (Garcia and Quintana-Domeque 2006).

For instance, a study by O'Brien et al. (2013), involving 102 undergraduate college students, found that obese women are much more likely to be discriminated during the hiring process. Survey participants were shown résumés including either a picture of a pre-bariatric surgery obese female or a photo of the same female post-bariatric surgery. The obese applicants were regarded as less suitable for employment. Following Roehling et al. (2007), overweight candidates are about 12 times more likely than normal-weight ones to be affected by discriminatory behavior in the labor market, while obese are 37 times more likely, and severe obese 100 times more likely. Moreover, significant differences also exist between women of different races, as another study evidenced stronger weight-based discrimination for White women than for African-American ones, maybe because being overweight is more common in that racial group, or because their race is considered a more important characteristic than weight (Hebl and Heatherton 1998; Maranto and Stenoien 2000). In line with this strand of literature, we decided to include Italians and immigrants in our sample, besides applicants with different gender and weight.

Types of discrimination are usually distinguished by economic theory into statistical and taste-based. The former occurs when the judgment about an individual depends on group characteristics rather than individual ones. The latter occurs, instead, when a group of individuals (either employers or customers) prefers a certain group over another, based on taste rather than any economic rationale (see, e.g., Lahey 2008 for a review of this literature).

Discrimination against obese people is not only a taste-based one, but it is argued that overweight employees “are absent more often, are more susceptible to on-the-job injuries and illnesses, and are less productive than others” (Paul and Townsend 1995), so that employers are prone to statistically discriminate obese workers (Lundborg et al. 2010).

In terms of interaction between gender and obesity, most research shows that overweight women are usually more discriminated than their men counterparts based on weight (Fikkan and Rothblum 2005; Puhl and Brownell 2001) and, consequently, that they receive less desirable job assignments than overweight men (Bellizzi et al. 1989).

A study by Puhl et al. (2008), using data from the U.S. National Survey of Midlife Development, shows that women were, on average, twice as likely to report weight-based discrimination than men.

Among racial groups, descriptive findings resulted in higher weight-based discrimination for African-Americans compared to Caucasians. However, in regression analyses, the odds of experiencing this kind of discrimination were not significantly higher for African-Americans

compared to Caucasians, maybe because this minority had a low representation in the study. So, further research is needed to clarify the ethnic differences in obesity discrimination.

### 3 The Experimental Design

Our empirical experiment focuses on the impact of obesity in the first stage of the hiring process. The reason behind this choice is that, if discrimination is going to occur, it is easier for firms not to interview a potential employee rather than firing him/her. In this respect, in Italy, one of the first studies on labor market discrimination, performed by Allasino et al. (2004), found that 26.6% of discrimination already occurs in the first stage of the hiring process.

To this end, we analyzed all the online job postings displayed in the first semester of 2013. In particular, we submitted 1952 curricula, half sent by women and half by men, in response to 244 employment ads published in the most important Italian job search websites, that do not require registration (e.g., [lavoratorio.it](#), [Lavoro&Stage](#), [Miojob](#), [Lavorare.net](#), [Page Personnel](#), [Trovalavoro](#), [Kijiji](#), [Inique Agenzia](#), [Archimede agenzia per il lavoro](#), [Manpower divisione Horeca](#), [Combinazioni s.r.l.](#), [Quanta agenzia per il lavoro](#), [Humangest](#), [Alma](#), [Orienta agenzia per il lavoro](#), [Varese centro per l'impiego](#), [Adecco](#), [Obiettivo lavoro](#), [Temporary agenzia per il lavoro](#), [Free work](#), [Maw](#), [Euro Interim](#), [Mr. Communication](#), [Open Job](#)). The decision not to choose websites which require registration is taken in order to avoid the administrators of the job ads to become suspicious.

We produced résumés based on the European format and structure, using fictitious names and addresses. To avoid matching problems, we adapted each CV to fulfill the skills required by the firms offering jobs. We created a Gmail account for each of the candidate categories, including the email address on the CV as contact information. Eight equivalent résumés were sent to each firm: four résumés with different photos of thin applicants (Italian and immigrant women and men), and four with photos of the same candidates modified to appear obese. We included immigrant candidates following the results from Hebl and Heatherton (1998) and Maranto and Stenoien (2000).

We manipulated the photos of the candidates to be attached in the CVs by using the *Fatbooth* app, available on Apple App Store. This software, working on the distances between mouth and chin, and enlarging the oval of the face, generates images of obese appearance.

Further electronic manipulations, such as changing the background or clothing color, were made by using Photoshop. These further manipulations were intended to make it more difficult for companies to recognize that the same person applied twice (before and after weight manipulation). Some examples of the manipulation of photos that were used in the study are available online in the Electronic supplementary material.

## 4 Data, Descriptive Statistics and Results

### 4.1 The Data

The sample is made up of 1952 job applications, with 8 candidates (Italian obese man, foreign obese man, Italian normal-weight man, foreign normal-weight man, Italian obese woman, foreign obese woman, Italian normal-weight woman, and foreign normal-weight woman) replying to the same 244 online job offers.

The offers were classified into Front Office and Back Office depending on the level of customer interaction required. The Front Office category includes jobs that involve face-to-face contact with the public. Another distinction about job offers concerns whether the tasks require physical strength. We classified as “Hard Work” either jobs for which physical strength is explicitly required, or those for which it may be unequivocally inferred; otherwise, the jobs were classified in the “Soft Work” category.

Responses were classified as call-backs if the employer requested an applicant to contact them (not just for clarification). According to a study released by Ladders, Inc. (Evans 2012) and reported by Time, Huffington Post, Business Insider and Forbes, the average time for a recruiter to screen a new CV during the first step of the hiring process is 6 s. Therefore, as we sent 8 CVs to each firm, the burden produced by our study to each employer amounts to about 48 s. Moreover, all the interview invitations were promptly declined, stating that the applicant had accepted another position and was no longer looking for employment.

Table 1 reports the descriptive statistics of the variables used in our analysis, splitting the sample into the applicants who were called back and the ones who were not invited for an interview.

We can observe that for the minority groups, which include women, immigrants and obese, the call-back rates are systematically lower with respect to the majority groups. In fact, less than 40% of female and obese applicants are called back, and this percentage decreases to 30% if the candidates are immigrants.

## 4.2 Discrimination Indexes – A New Approach

Using our data, we created several indexes separately measuring discrimination against men, women, natives, immigrants, obese, and normal-weight candidates. Indexes range from 0 to 1, taking the value of zero when no discrimination is observed (this is the case in which the firm replies to all the candidates), and one in cases of highest discrimination (none of the categories

**Table 1** Descriptive statistics – percentages of all variables by call-back

	Call-back				Total observations
	Yes		No		
	n	%	n	%	n
Woman	382	39.14	594	60.86	976
Man	452	46.31	524	53.69	976
Obese	362	37.09	614	62.91	976
Normal Weight	472	48.36	504	51.64	976
Immigrant	290	29.71	686	70.29	976
Italian	544	55.74	432	44.26	976
Graduate	206	42.21	282	57.79	488
High School	200	42.37	272	57.63	472
No Title	428	43.15	564	56.85	992
Front Office	306	35.42	558	64.58	864
Back Office	528	48.53	560	51.47	1088
Hard Work	156	41.49	220	58.51	376
Soft Work	678	43.02	898	56.98	1576
North-Center	666	42.26	910	57.74	1576
South-Islands	168	44.68	208	55.32	376

has been called back). All the values in between are scored 0.25, 0.50 and 0.75, depending on whether the firm decided to call back a number of categories of 3, 2, or 1, respectively.

Table 2 shows differences in discrimination against men, women, natives, immigrants, normal-weight and obese. They are calculated with respect to the discrimination indexes described above. In all cases, differences appear to be statistically significant and discrimination operates against women, immigrants and obese with respect to men, natives and non-obese.

Splitting the sample into front office and back office positions, discrimination indexes against men and women, natives and immigrants, and normal-weight and obese are shown in Table 3. Discrimination against women appears to be significantly higher than the one against men only for positions not involving customer interaction, while there are no statistically significant differences in terms of discrimination between men and women for jobs included in the “front office” category. On the contrary, obese candidates appear to be significantly discriminated over their non-obese counterparts only for front office positions. Moreover, immigrants appear to be significantly discriminated with respect to locals for both front- and back-office positions. Differences in discrimination between front- and back-office for obese, immigrants and women let think to taste-based reasons. Indeed, on the contrary, if discrimination was connected to statistical reasons, it would have acted for both front- and back-office jobs in the same way.

Splitting the sample into hard and soft work positions, discrimination indexes against men and women, natives and immigrants, and normal-weight and obese are shown in Table 4. A statistically significant discrimination against women over men appears to be affecting hard work positions. This last result seems to be connected to statistical reasons, because men are statistically more powerful than women. For positions not implying hard work, discrimination affects immigrants and obese, over natives and non-obese respectively. This could mean that immigrant candidates are preferred for jobs requiring physical strength, while they are considered to be “not good enough” for jobs implying no physical strength. Obese candidates are considered fit for jobs requiring physical strength only if jobs do not imply any “vis-à-vis” contact with customers.

Also, these results seem to be connected to taste-based discrimination for the same reason previously mentioned, meaning they should have been discriminated in the same way in all kinds of jobs if it were a discrimination based on statistical reasons.

Discrimination indexes against men and women, natives and immigrants, and normal-weight and obese concerning the education level required by the firm, are shown in Table 5. In terms of education, men are preferred over women for positions requiring high-school diploma and graduation, while locals and non-obese are preferred, over immigrants and obese

**Table 2** Discrimination indexes – men, women, natives, immigrants, normal-weight, obese

Discrimination against	Mean	Std. Err.	Difference in mean	<i>p</i> value
Men	0.517	0.017	–0.075	***
Women	0.592	0.017		
Natives	0.419	0.018	–0.271	***
Immigrants	0.690	0.020		
Normal-weight	0.455	0.017	–0.158	***
Obese	0.613	0.018		

Note: \*\*\*  $p < 0.001$



**Table 3** Discrimination indexes – front office/back office, by gender, nationality and weight

	Discrimination against	Mean	Std. Err.	Difference in mean	p value
Back office	Men	0.436	0.022	-0.129	***
	Women	0.564	0.025		
Front office	Men	0.623	0.023	-0.005	
	Women	0.627	0.020		
Back office	Natives	0.415	0.025	-0.170	***
	Immigrants	0.585	0.028		
Front office	Natives	0.424	0.025	-0.402	***
	Immigrants	0.826	0.021		
Back office	Normal-weight	0.477	0.025	-0.025	
	Obese	0.502	0.022		
Front office	Normal-weight	0.426	0.024	-0.331	***
	Obese	0.757	0.025		

Note: \*\*\*  $p < 0.001$

respectively, for all kind of jobs. While discrimination operating for all kinds of jobs in the same way seems to be connected to statistical reasons, discrimination differentiated on the basis of the level of education required by the job seems to be connected to taste-based reasons.

Finally, splitting the sample into offers belonging to firms operating either in northern or southern Italy, discrimination indexes against men and women, natives and immigrants, and normal-weight and obese are shown in Table 6. While the northern part of the country appears to discriminate against women, immigrants and obese applicants, compared to men, natives and non-obese respectively, the South of Italy seems to discriminate against immigrants over natives, but not against women and obese, respectively compared to men and non-obese. All the differences are statistically significant, and they are most probably connected to cultural differences between the two areas.

### 4.3 The Correspondence Test

As the indexes previously mentioned are not so common in this kind of analyses, we calculated correspondence tests, which are considered a standard method (Jowell and

**Table 4** Discrimination indexes – hard work/soft work, by gender, nationality and weight

	Discrimination against	Mean	Std. Err.	Difference in mean	p value
Soft work	Men	0.540	0.019	-0.013	
	Women	0.553	0.017		
Hard work	Men	0.426	0.036	-0.319	***
	Women	0.745	0.041		
Soft work	Natives	0.362	0.018	-0.369	***
	Immigrants	0.731	0.021		
Hard work	Natives	0.644	0.038	0.117	
	Immigrants	0.527	0.044		
Soft work	Normal-weight	0.443	0.020	-0.184	***
	Obese	0.627	0.021		
Hard work	Normal-weight	0.505	0.034	-0.053	
	Obese	0.559	0.037		

Note: \*\*\*  $p < 0.001$



**Table 5** Discrimination indexes – no title, high-school, graduation, by gender, nationality and weight

Education level	Discrimination against	Mean	Std. Err.	Difference in mean	p value
No title	Men	0.527	0.026	-0.046	
	Women	0.574	0.025		
High-school	Men	0.500	0.034	-0.123	*
	Women	0.623	0.036		
Graduation	Men	0.513	0.028	-0.086	*
	Women	0.599	0.029		
No title	Natives	0.435	0.027	-0.231	***
	Immigrants	0.666	0.030		
High-school	Natives	0.434	0.037	-0.254	***
	Immigrants	0.689	0.041		
Graduation	Natives	0.371	0.028	-0.371	***
	Immigrants	0.741	0.032		
No title	Normal-weight	0.473	0.026	-0.155	***
	Obese	0.628	0.028		
High-school	Normal-weight	0.456	0.033	-0.140	**
	Obese	0.596	0.036		
Graduation	Normal-weight	0.418	0.032	-0.181	***
	Obese	0.599	0.031		

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

Prescott-Clarke 1970), in order to use them as robustness check. The correspondence test allows us to calculate the percentage of net discrimination between normal-weight individuals and obese in all the considered categories. The preliminary results of our experiment (Table 7, column 11) show that obese are discriminated in all subgroups, with relevant results for immigrants. In this case, the concerning call-back rate is equal to 0.56 and decreases to 0.46 if the immigrant is a woman.

Table 7 also shows the aggregated results of the correspondence test considering obese as minority group and normal-weight as majority one.

In the first column, we report the total number of job offers. We performed a correspondence test on the replies obtained by the firms. In this respect, four are the possible outcomes: no one invited for an interview (second column); both invited (third column); only one applicant, either normal weight or obese, invited (fifth and sixth columns, respectively). In

**Table 6** Discrimination indexes – North-Center, South and Islands, by gender, nationality and weight

Area	Discrimination against	Mean	Std. Err.	Difference in mean	p value
North-Center	Men	0.525	0.019	-0.083	***
	Women	0.608	0.018		
South and Islands	Men	0.482	0.041	-0.036	
	Women	0.518	0.045		
North-Center	Natives	0.436	0.019	-0.260	***
	Immigrants	0.697	0.021		
South and Islands	Natives	0.339	0.046	-0.321	***
	Immigrants	0.661	0.052		
North-Center	Normal-weight	0.443	0.019	-0.186	***
	Obese	0.629	0.020		
South and Islands	Normal-weight	0.512	0.047	-0.030	***
	Obese	0.542	0.047		

Note: \*\*\* $p < 0.001$

the other two columns, we report the total number of normal-weight and obese applicants invited. Considering these results, we calculated net discrimination as the ratio between the difference in discrimination against obese (column 5: only normal-weight invited) and the one against normal weight (column 6: only obese invited) over the total number of jobs for which at least one candidate was invited. The difference in discrimination is reported in column 9, while the previously mentioned ratio is reported in column 10. Finally, we report the relative call-back rate as the ratio of the number of obese applicants invited, to the number of normal-weight applicants invited.

The Net Discrimination Index (NDI) calculated shows that weight-based discrimination exists for all the considered subgroups, but it differs depending on the subgroup analyzed. Even if the difference is not high, the NDI is higher for women than for men (about 18% and 15%, respectively). Significant differences are found by comparing Italian and immigrant candidates. Indeed, the index for the Italian candidate is equal to 8%, while for immigrants it is 39%. It decreases to 7% for the Italian when considering just women, while it amounts to 46% for immigrant women. For men, it amounts to 8% considering Italians only, and to 28% for immigrants. From these first results, we can easily realize that weight-based discrimination is more relevant among immigrants than among Italians. Moreover, in terms of gender gap, it is more pronounced within immigrants than within Italians.

The two following tables show the same type of data description for each level of education (Table 8) and for each kind of job (Table 9).

Table 8 shows that weight-based discrimination is higher for immigrants than for Italians. Deeply, immigrant women appear to be discriminated the most due to their weight when they apply for a job requiring High-school or no title, while men are mostly discriminated when they apply for a job requiring graduation.

Concerning the type of job, Table 8 shows that both Italians and immigrants are mostly discriminated for their weight when they apply for a front-office and/or a soft work job. Deeply, Italians are discriminated for not being obese if they apply for a back office or a hard work job, and this happens for both women and men (Table 9).

## 5 Probit Analysis

### 5.1 The Model

Following past studies applying a Probit model approach to capture the effects of discrimination in the outcome between similar people (e.g., Busetta et al. 2018; Drydakis 2009; Kaas and Manger 2012), we estimated Probit regressions to analyze whether discrimination based on ethnic origin, weight and sex separately and/or jointly affect the opportunities of finding a job in the Italian labor market. In our equation model (Eq. 1), the dependent variable  $Y$  (Call-back) is a dummy that takes value 1 if the firm replies to the candidate, and 0 otherwise.

$$Y_i^* = \beta_0 + \beta_1 Woman_i + \beta_2 Obese_i + \beta_3 Immigrant_i + \beta_4 Graduate_i + \beta_5 HighSchool_i + \beta_6 FrontOffice_i + \beta_7 HardWork_i + \beta_8 South_i + \varepsilon_i \quad (1)$$

where  $Y^*$  is the latent variable reflecting the probability for the  $i$ -th applicant to receive a call-back.

**Table 7** Correspondence test on weight-based discrimination, by sex and nationality

	Jobs		Neither invited	At least one invited	Equal treatment	Only normal weight invited	Only obese invited	Normal weight	Obese	Net discrimination		Relative call-back rate
	1	2								3	4	
Woman	244	47		197	104	64	29	168	133	35	17.77	0.79
Man	244	26		218	130	60	28	190	158	32	14.68	0.83
Italian	244	20		224	134	54	36	188	170	18	8.04	0.90
Immigrant	244	93		151	60	75	16	135	76	59	39.07	0.56
Italian W	244	63		181	71	61	49	132	120	12	0.07	0.91
Immigrant W	244	139		105	25	64	16	89	41	48	0.46	0.46
Italian M	244	45		199	93	61	45	154	138	16	0.08	0.90
Immigrant M	244	124		120	40	57	23	97	63	34	0.28	0.65
										No.		

**Table 8** Correspondence test by sex, nationality and education level

	Jobs		Neither invited	At least one invited	Equal treatment	Only normal weight invited	Only obese invited	Normal weight	Obese	Net discrimination		Relative call-back rate
	1	2								3	4	
<b>Italian Women</b>												
No title	124	34	90	36	36	18	72	54	18	0.20	0.75	
High school	59	18	41	17	10	14	27	31	-4	-0.10	1.15	
Graduate	61	11	50	18	15	17	33	35	-2	-0.04	1.06	
<b>Immigrant Women</b>												
No title	124	63	61	16	37	8	53	24	29	0.48	0.45	
High school	59	38	21	7	14	0	21	7	14	0.67	0.33	
Graduate	61	38	23	2	13	8	15	10	5	0.22	0.67	
<b>Italian Men</b>												
No title	124	28	96	47	31	18	78	65	13	0.14	0.83	
High school	59	9	50	21	14	15	35	36	-1	-0.02	1.03	
Graduate	61	8	53	25	16	12	41	37	4	0.08	0.90	
<b>Immigrant Men</b>												
No title	124	66	58	24	24	10	48	34	14	0.24	0.71	
High school	59	28	31	12	13	6	25	18	7	0.23	0.72	
Graduate	61	30	31	4	20	7	24	11	13	0.42	0.46	

**Table 9** Correspondence test by sex, nationality and type of job

	Jobs		Neither invited	At least one invited	Equal treatment	Only normal weight invited	Only obese invited	Normal weight	Obese			Relative call-back rate
	1	2							3	4	5	
Italian Women	108	22		86	27	48	11	75	38	37	0.43	0.51
Office												
Back office	136	41		95	44	13	38	57	82	-25	-0.26	1.44
Hard work	47	32		15	3	2	10	5	13	-8	-0.53	2.60
Soft Work	197	31		166	68	59	39	127	107	20	0.12	0.84
Immigrant Women												
Front Office	108	71		37	2	29	6	31	8	23	0.62	0.26
Back office	136	68		68	23	35	10	58	33	25	0.37	0.57
Hard work	47	26		21	9	9	3	18	12	6	0.29	0.67
Soft Work	197	113		84	16	55	13	71	29	42	0.50	0.41
Italian Men												
Front Office	108	22		86	36	39	11	75	47	28	0.33	0.63
Back office	136	23		113	57	22	34	79	91	-12	-0.11	1.15
Hard work	47	11		36	13	6	17	19	30	-11	-0.31	1.58
Soft Work	197	34		163	80	55	28	135	108	27	0.17	0.80
Immigrant Men												
Front Office	108	79		29	3	23	3	26	6	20	0.69	0.23
Back office	136	45		91	37	34	20	71	57	14	0.15	0.80
Hard work	47	9		38	21	10	7	31	28	3	0.08	0.90
Soft Work	197	115		82	19	47	16	66	35	31	0.38	0.53

On the right side of the equation, we refer to parameters with Greek letters.  $\beta_0$  is the constant term and  $\varepsilon$  is the disturbance term. The main explanatory variables are the sex of the candidate (*Woman*: 1 = yes; 0 = Man); a dummy variable that indicates whether the candidate is obese (1 = yes; 0 = otherwise); a dummy variable that indicates the nationality of the candidate (1 = immigrant; 0 = Italian); the education level of the candidate, also corresponding to the education required by the job, divided into three dummy variables (*Graduate*: 1 = yes, 0 = otherwise; *High School*: 1 = yes, 0 = otherwise; reference: No title); two dummy variables regarding the job characteristics of the offer (*Front Office*: 1 = yes, 0 = Back Office, *Hard Work*: 1 = yes, 0 = Soft work); finally, we consider the geographical area in which the job would be performed (*South*: North-Center = 0; South and Islands = 1).

Moreover, we estimated a Probit model with a triple dummy-variable interaction term, adding to the basic model (Eq. 1) the three main variables of interest regarding the different kinds of discrimination (Woman, Obese and Immigrant) and their pairwise and triple interactions (Eq. 2). In this way, we can study whether being obese and/or immigrant differently affects the probability of obtaining a call-back depending on gender, and whether being immigrant differently affects the probability of being called back in the two cases of obese and normal-weight candidates.

$$\begin{aligned}
 Y_i^* = & \beta_0 + \beta_1 \text{Woman}_i + \beta_2 \text{Obese}_i + \beta_3 \text{Immigrant}_i + \beta_4 \text{Woman}_i * \text{Obese}_i \\
 & + \beta_5 \text{Woman}_i * \text{Immigrant}_i + \beta_6 \text{Obese}_i * \text{Immigrant}_i \\
 & + \beta_7 \text{Woman}_i * \text{Obese}_i * \text{Immigrant}_i + \beta_8 \text{Graduate}_i + \beta_9 \text{HighSchool}_i \\
 & + \beta_{10} \text{FrontOffice}_i + \beta_{11} \text{HardWork}_i + \beta_{12} \text{South}_i + \varepsilon_i \quad (2)
 \end{aligned}$$

A sensitivity analysis was performed by applying a Linear Probability model with robust standard errors, to estimate the probability of receiving a positive response in the two cases of equation models with and without interaction effects (Eqs. 1–2). The results reported in the next Section (Tab. 10) led to similar results, confirming the robustness of our estimations. Moreover, we check results' robustness to model specification by comparing the Linear Probability model's predicted probabilities with the ones from the Probit model. The two predicted probabilities are nearly identical, with a correlation of .9977.

## 5.2 Estimation Results

From the estimation results and predicted probabilities reported in the following Tables (Tabs. 10 and 11), we can observe that the minority subgroups (Women, Obese and Immigrant) are more discriminated than their majority counterparts. The signs and the magnitude of our regressors are robust considering the model without (Eq. 1) and with (Eq. 2) the interaction terms.

In particular, the results from the general model (see Table 11) show that the probability of obtaining a call-back decreases by 7 percentage points if the candidate is a woman (the predicted probability is equal to 0.46 for men and 0.39 for women); by 11 percentage points if the candidate is obese (0.48 and 0.37 for normal-weight and obese, respectively), and of 26 percentage points if the candidate is an immigrant (0.56 for Italian candidates and 0.30 for immigrant candidates). The probability of obtaining a call-back is lower for front office jobs, decreasing by 17 percentage points with respect to back office ones (from 0.50 to 0.33, respectively), while it moves from 0.44 to 0.35 if we consider soft work and hard work (10 percentage points).

**Table 10** Estimation results – Linear Probability Model and Probit model

	Linear Probability Model						Probit					
	Equation 1			Equation 2			Equation 1			Equation 2		
	Coef.	Std. Err.	p value	Coef.	Std. Err.	p value	Coef.	Std. Err.	p value	Coef.	Std. Err.	p value
Woman	-0.07	0.02	***	-0.09	0.05	*	-0.20	0.06	***	-0.23	0.11	*
Obese	-0.11	0.02	***	-0.07	0.04	***	-0.32	0.06	***	-0.17	0.12	***
Immigrant	-0.26	0.02	***	-0.23	0.04	***	-0.71	0.06	***	-0.61	0.12	***
Graduate	-0.07	0.03	**	-0.07	0.03	**	-0.21	0.08	**	-0.21	0.08	**
High School	-0.05	0.03	***	-0.05	0.02	***	-0.14	0.08	***	-0.14	0.08	***
Front Office	-0.17	0.02	**	-0.17	0.02	**	-0.49	0.07	**	-0.50	0.07	**
Hard Work	-0.10	0.03	**	-0.10	0.03	**	-0.27	0.08	**	-0.27	0.09	**
South and Islands	0.01	0.03		0.01	0.03		0.02	0.08		0.02	0.08	
Woman*Obese				0.02	0.06					0.04	0.16	
Woman*Immigrant				0.06	0.06					0.15	0.16	
Obese*Immigrant				-0.07	0.06					-0.24	0.17	
Woman*Obese*Immigrant				-0.07	0.08					-0.27	0.24	
Constant	0.77	0.03	***	0.76	0.04	***	0.76	0.09	***	0.69	0.1	***

Note: \* $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$



**Table 11** Predicted probabilities of the Probit estimation model

	Predicted probability	Std. Err.	p value
Man	0.46	0.02	***
Woman	0.39	0.01	***
Normal Weight	0.48	0.02	***
Obese	0.37	0.01	***
Italian	0.56	0.02	***
Immigrant	0.30	0.01	***
Graduate No	0.45	0.01	***
Graduate Yes	0.37	0.02	***
High School No	0.44	0.01	***
High School Yes	0.39	0.02	***
Back office	0.51	0.02	***
Front Office	0.33	0.02	***
Soft Work	0.45	0.01	***
Hard Work	0.35	0.02	***
North-Center	0.43	0.01	***
South and Islands	0.43	0.02	***

Note: \*\*\*  $p < 0.001$

In Table 12, we report the results of the double interaction effects, considering the different types of discrimination: gender-, race-, and weight-based. For men, the discrimination due to weight difference is equal to 10% (0.51 for normal-weight men, and 0.41 for obese men), while the discrimination for women is equal to 12% (0.45 and 0.33, normal-weight and obese, respectively). The gender difference is almost 2 percentage points larger for average obese individuals compared with similar normal-weight individuals. Indeed, in the subgroup of normal-weight, the gender difference is equal to 6% (0.51–0.45), while this gap is equal to 8% in the obese subgroup (0.41–0.33).

The table also shows that racial discrimination for men is equal to 27%, as a result of the difference between the predicted probability for the Italian man (0.60) and the one for the immigrant man (0.33). Considering the subgroup of women, racial discrimination is equal to 25%.

Among Italians, the gender difference is equal to 8 percentage points (0.60–0.52), while for immigrants the gender gap decreases to 6 percentage points (0.33–0.27).

**Table 12** Predicted probabilities – two-fold interaction terms

	Predicted probability	Std. Err.	p value
Man - Normal Weight	0.51	0.02	***
Man - Obese	0.41	0.02	***
Woman - Normal Weight	0.45	0.02	***
Woman - Obese	0.33	0.02	***
Man - Italian	0.60	0.02	***
Man - Immigrant	0.33	0.02	***
Woman - Italian	0.52	0.02	***
Woman - Immigrant	0.27	0.02	***
Italian - Normal Weight	0.59	0.02	***
Italian - Obese	0.53	0.02	***
Immigrant - Normal Weight	0.38	0.02	***
Immigrant - Obese	0.21	0.02	***

Note: \*\*\*  $p < 0.001$

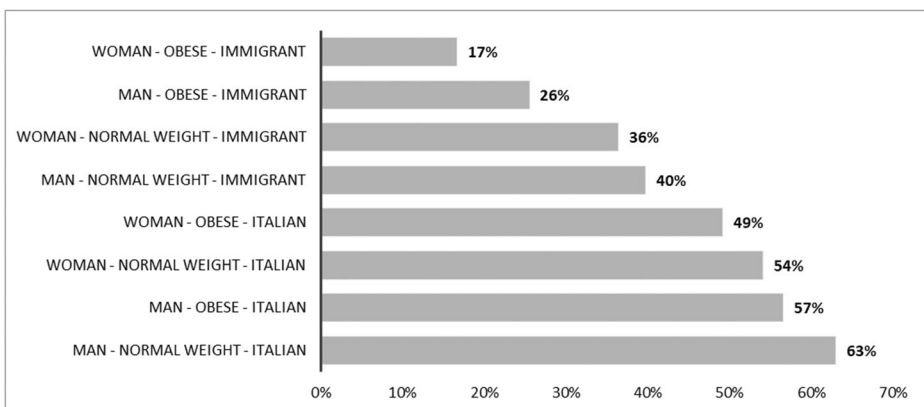
Finally, among Italians, the difference in call-backs between normal-weight and obese is equal to 6%, while it goes up to 17% for immigrants. The racial discrimination for normal weight candidates is therefore equal to 21% (0.59–0.38), but it increases to 32% (0.53–0.21) if the candidate is also obese.

Taking the predicted probabilities of the triple interaction effects into account, we can rank the discrimination experienced by the different categories of applicants. We report the results in the following figure (Fig. 1), showing that the most disadvantaged group is the one of immigrant obese women (17% predicted probability of being called back), followed by men in the same subgroup. In between Italians, the gender gap appears to be stronger than the gap connected to weight-based discrimination, while the opposite happens for immigrants.

## 6 Conclusions

We examined weight-based discrimination in the labor market, focusing on the first stage of the hiring process. To this end, we sent a total of 1952 fictitious résumés to 244 firms, in response to real job openings; each firm received 8 comparable CVs which matched the advertised requirements, differing only for candidates' nationality, gender and body weight. We analyzed the number of call-backs for each profile as a measure of discrimination against the different categories of individuals. Our findings provide significant evidence of discrimination against obese people in Italy in the course of the recruitment process.

This paper has important policy implications and shows that discrimination based on weight is turning to be worrying. The main interest for evidence regarding the nature and extent of the relationship between employees' weight and perceived discrimination concerns the implications in terms of policy for legal protection against weight-based discrimination (Homer 2005; Roehling et al. 2007; Theran 2001), as it may result in skilled individuals remaining outside the labor market, especially in the case of front-office jobs (Solovay 2000). Moreover, unemployment may worsen obesity even more (Cawley 2004) and this could result in higher mortality for obese people, particularly as it becomes more difficult for them to afford medical expenses. Except for jobs in which being normal weight is necessary in order to correctly perform the working tasks, obese workers deserve the same rights and employment opportunities as everyone else (Puhl and Brownell 2001).



**Fig. 1** Predicted probabilities – triple interaction effects by sex, weight, and nationality

We conducted a prior analysis with correspondence tests, showing that obese candidates always obtain fewer call-backs than non-obese, women fewer call-backs than men, and immigrants fewer call-backs than natives. In relative terms, the gender gap – in terms of difference in the probability of obtaining a job interview – is quantitatively less relevant than the gap caused by being obese. In turn, the last difference is less relevant than the one depending on the candidate's nationality.

The Probit estimation results confirmed that immigrant candidates are more discriminated for their weight compared to natives. In this respect, the impressive result is that normal-weight immigrants get discriminated more than obese Italians. Being obese produces a lower level of discrimination than being immigrant, and this result persists for both women and men. Moreover, the gender difference is larger for obese individuals than for normal-weight ones. In particular, immigrant women experience a very high level of discrimination compared to the other categories. Even though the presented figures may look minimal, their actual impact is not, considering the current rise in obesity rates in the Italian population and the strong increase in the portion of obese people in between children age.

Our findings are in contrast with the main literature for which discrimination based on weight appears to be stronger for white women than for Afro-American ones (Hebl and Heatherton 1998; Maranto and Stenoien 2000) or eventually equal (Carr and Friedman 2005; Roehling et al. 2007). In our opinion, this is merely a country-based difference: none of the previous analyses on the field concentrated their attention on Italy, which is indeed a country with low levels of obesity among adults (OECD 2017) and, especially for women, high importance given to fashion and attractiveness (Busetta et al. 2020).

In contrast to men, obese women are more likely to be discriminated against on the basis of appearance (taste-based discrimination) rather than for statistical reasons, of which the effects usually diminish or even disappear over time (Mason 2012). In this regard, some meta-analytic studies (Rudolph et al. 2009; Vanhove and Gordon 2014) show that the weight effect is stronger during the recruitment process than in the course of workers' performance evaluation, and that obese women keep being evaluated more negatively than obese men at every stage of the employment cycle, evidencing a higher level of taste-based discrimination.

As Italy is currently characterized by a high level of gender gap in the labor market (see, e.g., Busetta et al. 2018), the fact that this gap might increase even more, due to the rise in obesity rates, makes this a serious case for concern. Indeed, equal employment opportunity policies aimed at protecting obese individuals would also inevitably include women as protected classes, promoting gender equality in the workplace (Roehling et al. 2007) and, in this way, reducing gender socio-economic inequalities.

When little information is available to evaluators, they tend to make their decisions based on easily observable features such as weight (Gordon and Arvey 2004), often not realizing that their judgments are affected by cognitive errors (Pronin 2008). Making employers aware of this through self-diagnosis may help to prevent the expression of stereotypes in the recruitment process (Agerström and Rooth 2011), which lead to not fully using the potential of obese and, particularly, of female obese employees. Moreover, a policy of not allowing the inclusion of photographs in job applications may help to achieve a less discriminative hiring process, as implicit stereotypes may matter less and even be disconfirmed at the interview stage, when the recruiter can focus on personality characteristics and learn more about the candidate (Agerström and Rooth 2011; Flint et al. 2016).

It would also be useful to learn about potential strategies that successful obese workers might have used to avoid or minimize discrimination and inform obese individuals about the

prejudices that they may encounter and the ways through which they can reduce them (Roehling et al. 2007).

Moreover, as weight-loss diets do not provide long-term weight reduction for the majority of people (Wing and Phelan 2005), giving more attention to weight maintenance could both eradicate the discrimination problem and result in better health. To this end, educating children by means of school-based food and nutrition policies is essential (Jaime and Lock 2009), also considering that a significant part of children's daily calories is estimated to be eaten at school (Gleason and Sutor 2001). In addition, educating children to perform more physical activity decreases their likelihood of becoming obese adults (Menschik et al. 2008).

Since obesity damages labor market outcomes, the existing socio-economic inequalities in obesity (OECD 2017) tend to increase even further (Devaux and Sassi 2015). Indeed, obesity is more common among the poorest part of the population, and job discrimination against obese people is strong, as confirmed by our results. In this way, socio-economic inequalities affecting obese people will make them even poorer.

By supporting obese individuals and protecting them from discrimination, either by policy measures or bias-reducing strategies, they will be stimulated to invest more in their own human capital and increase their contribution to the economy.

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