The Wage Effects of Social Norms – Evidence of Deviations from Peers' Body Mass in Europe

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ABSTRACT: We investigate wage effects of deviations from peer group body mass index (BMI) to evaluate the influence of social norms on wages. Our approach allows to show the existence of the influence of the social norm and to disentangle it from any (anticipated) productivity effects associated with deviations from a clinically recommended BMI in certain sections of the weight distribution. Estimates of between-effects models for 9 European countries for the years 1998 to 2001 suggest that the influence of the social norm varies considerably between countries, and wage penalties are rather found for upward deviations from the norm and for men.

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1 INTRODUCTION

Despite the manifold casual evidence that social norms influence labor market institutions and social exchange, empirical analyses of the effects of social norms have been rare. However, there have been various attempts to include social norms (or related concepts like social customs and conformity) in economic models, see e. g. Akerlof (1980), Bernheim (1994), Lindbeck, Nyberg and Weibull (1999), Sliwka (2007) and Akerlof (2008). A preliminary for empirical investigations on the role of social norms is the agreement on a definition for the social norm. According to Hart (1961, p. 9), a social rule exists when "a group of people, or most of them, behave 'as a rule', i. e. *generally*, in a specified similar way in certain kinds of circumstances." Hart (1961, p.10) further states that the crucial difference between a social rule and mere convergent routine behavior in a social group is "the fact that deviations from certain types of behaviour will probably meet with hostile reaction." This notion is adopted in the more recent economic literature. Fehr and Gächter (2000, p. 166) define a social norm as "a behavioral regularity; that is ... based on a socially shared belief of how one ought to behave; which triggers ... the enforcement of the prescribed behavior by informal social sanctions." Of course, social norms regarding body mass differ with respect to gender, place and time, as do beauty ideals. The men of the Bodi tribe in south Ethiopia compete in who has the biggest belly to decide which of them becomes new king, while young women in parts of Mali and Mauretania get forcefed gallons of camel milk to put on weight to increase their chances on the marriage market. According to the latest estimations of the WHO (2014) in some island states in the South Sea like Nauru, American Samoa, Tokelau or Tonga, about 55 up to 78 percent of the population are obese.The ideal beauty of the human body does not only vary on a geographical dimension but also in a historical dimension which is apparent when studying the history of art. For example, Cichon-Hollander (1999) states that “Ideal beauty is corresponding with the aesthetic feeling of people of a respecting period.” This is obvious when considering the stark contrast between Boticelli’s painting “Birth of Venus” dating back to the 15th century to the slim “curveless” body ideal for women in the paintings and drawings of the Expressionism (e.g. by Egon Schiele or Max Beckmann) in the 20s of the last century.

Empirically, the basic problem is to infer the prevalent social norm from empirical observations. Empirical approaches in the economic literature to measure the influence of social norms considered the relevance of social norms for the behavior of the unemployed (see e. g. Moffitt (1983), Clark (2003) or Stutzer and Lalive (2004)), pro-environmental behaviour like littering (see Torgler, Frey and Wilson (2009)), sexual activity (see Castronova (2004)), criminal behavior (see e. g. Case and Katz (1991) and Glaeser, Sacerdote and Scheinkman (1996)), ideal body weight (see Etilé (2007)) and teenage behavior (see e. g. Kooreman (2007)). Blanchflower, van Landeghem and Oswald (2009) show that the body mass index (BMI) relative to their peers' can influence a person's well-being and that even imitative obesity can emerge.[1]

Even if it were possible to infer the prevalent social norm from empirical observations, it is difficult to link this behavior with economic consequences. If social norms prevail in employment relations, one possible sanction for deviating behavior could be lower wages compared to workers behaving according to the implicit norm. This is possible if wages do not reflect solely the productivity of the worker, but also the preferences of the employer which are present during wage setting in a Becker (1971) type discrimination model.

In the present paper, we suggest norms governing body mass, measured by a person's body mass index (BMI), as an avenue to identify and study wage effects of social norms. This is possible because we argue that peers' BMI constitute a social norm in a sense that deviations from the peer group median BMI imply sanctions such as lower market wages. The BMI is calculated by dividing a person's weight in kilograms by its squared height in meters.[2]

[1] There are also studies from experimental economics on the effects of social norms. The reason is that it is easier in laboratory settings than in field settings to induce a social norm and study its effects on economic outcomes (see e. g. Fehr and Gächter (2000), Falk and Fischbacher (2002), and Falk and Ichino (2006)). However, the study of wage effects in the experimental laboratory requires strong assumptions on the external validity of the experiments. Therefore, these studies appear to be less relevant in this context.

[2] We are aware of the limitations of BMI as measure for body shape, because it does not account for the distribution of an individual's fat- and muscle mass. Alternate measures like percent of body fat, proposed by e. g Burkhauser and Cawley, (2008) should be used when adequate data is available. For instance in their recent work, Johansson, Böckerman, Kiiskinen and Heliövaara (2009) analyzed the impact of obesity on success in the Finish labor market using fat mass and waist circumference in addition to BMI as measures of obesity and Wada and Tekin (2010) showed how body fat and fat-free mass influence wages in the US.

Our empirical strategy allows us to show that a *social norm effect,* defined by deviations from peers' BMI, influences wages in addition to a *productivity effect,* defined by deviations from a clinically optimal BMI.

Productivity effect

The optimal BMI from a clinical perspective is defined as a BMI with the lowest risk of any future weight-related diseases (diabetes, heart attacks etc.). Finding a wage penalty for deviations from the optimal weight-to-height measure in estimates while controlling for current health status can be interpreted as a lower future productivity reflected in current wages. Employers might sanction anticipated future health risks associated with an unhealthy body shape with lower wages to smooth the life-time payroll. This effect is enforced by rigid labor market institutions which make it costly to dismiss an unproductive worker in the future. Lower wages might also reflect a lower productivity of the worker due to lower investments in human capital, because a shorter work life due to future health risks is anticipated by the employee and the employer. Note however, that a lower wage associated with deviations from an optimal BMI might also reflect sanctions for deviations from a norm as constituted by the optimal BMI from a clinical point of view.

Social norm effect

Weight is perceived as volitional (see Goode (2008) or Saporta and Halpern (2002)) and is therefore also governed by social norms regarding a "normal" BMI. While a part of the human physical appearance is genetic, a considerable part is accounted to individual behavior and is therefore potentially under the rule of a social norm according to the definition in Fehr and Gächter (2000). For instance, according to Goode (2008, p. 337) sociologists consider the study of obesity as particularly interesting, "because it is considered by the thin or averaged-sized majority as both physical characteristic, like blindness or paraplegia, and a form of behavioral deviance, like prostitution or alcoholism. The obese, unlike the physically disabled, are held responsible for their condition." This is supported by evidence of DeJong (1980) that adolescent girls evaluate an obese peer less positively unless she "could offer an 'excuse' for weight, such as a glandular disorder." We consider it as evidence for the existence of a social norm governing body mass if we do find wage discrimination for a deviation from the group norm on body mass.[3] The norm is defined by the gender, age group, and region specific median BMI. Lower wages associated with deviations from the group norm reflect employers' preferences to deal with workers with a norm-compatible body shape.

The volitional character of body mass is probably the reason why discrimination on the basis of body mass is typically not on the agenda when discussing labor market discrimination. The disregard of discrimination by body stature is astonishing in the light of existing evidence. Roehling (1999, p. 982) concludes, after an interdisciplinary review of empirical research on weight-based discrimination in employment, that "evidence of discrimination is found at virtually every stage of the employment cycle." Furthermore, data of a Swedish field experiment conducted by Rooth (2009) shows that discrimination of obese applicants is the same against men and women, but that there is a systematic variation across occupations. There is some evidence that the more customer contact an occupation includes, the more discrimination against obese applicants takes place. However, findings on the relationship between obesity and employment are mixed. While Morris (2007) shows a negative effect on employment for men and women in England, the effect for women is underestimated if not controled for the endogeneity of obesity. Lindeboom, Lundborg and van der Klaauw (2010) show for Britan that the negative influence of obesity on employment becomes insignificant when controlling for endogeneity of obesity for both sexes. For Germany, Caliendo and Lee (2013) show that obese women are disadvantaged in finding a job compared to women of normal weight, while there is no such effect for obese men.

Our approach is inspired by Harper (2000). He finds that relative weight measures in the form of indicator variables, which represent the location of the respondent in the gender distribution of body mass for a given age, are more relevant than absolute measures of obesity. A similar approach is followed in Saporta and Halpern (2002) who use relative

[3] This approach follows the reactive definition of deviant behavior in sociology. According to the reactive definition, deviant behavior (and therefore the respective reference norm) exists, if negative consequences of deviant behavior are observed (Goode, 2008).

weight measures to control for a potentially different distribution in body mass in a sample of lawyers. While these studies emphasize the importance of identifying the influence of weight differences from a norm, there have so far not been any attempts to disentangle these norm effects from productivity effects.

The present paper aims to take a conservative approach on the influence of body mass on wages avoiding several shortcomings in existing studies. We take account of direct health problems related to body shape by controlling for subjective health assessments. Since body mass increases naturally with age, the sample is restricted to workers between 19 and 44 of age to avoid a structural break in the body mass-wage relation. By including dummy variables for deviations in the lower and upper direction of a reference body mass, we allow for a non-linear relation between body mass and wage. Beside the studies by García and Quintana-Domeque (2007) and Atella, Pace and Vuri (2008), this is the only study providing multi-country evidence on the weight-wage relation with separate estimates for each country. The latter is, however, indispensable as different labor market institutions prevail in the different European countries.

The study of wage effects of physical appearance attracted the interest of economic research in the nineties with the seminal work by Hamermesh and Biddle (1994) and Averett and Korenman (1996). Recently, the availability of longitudinal data providing information on weight and wages has stimulated the application of different econometric approaches to come closer to a *causal* relation between weight and wages. The more recent literature has been particularly inspired by Cawley (2000), (2004) and Behrman and Rosenzweig (2001).

Also the availability of standardized longitudinal European data including information on various socio-economic characteristics caused a recent interest on the weight-wage relation in Europe, in particular in a cross-country context. Sousa (2005) and Brunello and D'Hombres (2007) apply a propensity score and an instrumental variable approach, respectively, to identify a causal relation between body weight and wages. However, these studies only exploit the informational content of a cross-country comparison to a limited extent. None of these papers attempted to disentangle productivity effects from social norm effects in the relation between body mass and wages.

The paper is organized as follows. The next section describes the approach to identify an influence of the social norm concerning body mass on wages. Features of the data and the sample used in this paper are reported in section 3. Section 4 describes and discusses the results. Section 5 concludes.

2 Empirical Approach

We first discuss implications from different approaches to identify a causal relation of body mass on wages for the present paper. After that we describe our empirical strategy to show the existence of penalties for deviations from peers' BMI (social norm effects) and how we can disentangle them for some part of the weight distribution from penalties for deviations from medically optimal BMI (productivety effect).

The causal effect of body mass on wages

According to Cawley (2004), there are three reasons that might explain a negative correlation between body mass and wages, which have been found in several empirical studies. First, the effect of body mass on wages might reflect a lower productivity through body size or discrimination. Second, this correlation could also identify an effect of wages on body size, for instance, via changes in the behavior of food intake or the quality of the consumed food. Third, unobservable individual effects might be correlated with both weight and wages. Several econometric approaches are applied in the literature to explain which of the suggested explanations for the correlation between weight and wages should be followed.

Estimates using lagged values of body mass in wage equations remove any contemporaneous effects, if lagged body mass is independent of the residual in the current wage equation. The independence assumption would be violated, for instance, if overweight during some course in life is the result of a genetic predisposition towards overweight which might also be correlated with workplace productivity. See Cawley (2004) for a more formal development of this argument. A second approach controls for unobserved heterogeneity by taking differences with a sibling, with a close family member or alternatively by fixed effects estimates. The underlying assumption for the latter is that unobserved individual heterogeneity remains constant over time. Given the comparatively short time span of the data used in the present paper (4 years), this assumption might not be too hazardous. However, the data are in this case not very informative about the within-individual variation. Moreover, if most of the true variation in body mass is cross-sectional and body mass (and in particular the individual variation in body mass over time) is measured with error, coefficients are biased toward zero and standard errors are high (Hamermesh, 2000). Brunello and D'Hombres (2007) report according evidence that this might be the case when using ECHP data.

The instrumental variable (IV) approach also comes along with major shortcomings. Cawley (2004) uses a sibling's body mass when controlling for age and gender as an instrument. The validity of the approach hinges on the non-testable assumption that a sibling's BMI is uncorrelated with the error term in the wage regression of the individual. In particular, as long as the precise transmission mechanism is unclear, it is equally likely that the same genetic or non-genetic characteristic, which leads to the siblings' BMI being correlated, also leads to other factors affecting labor market outcomes being correlated. The latter reflects a violation of the order condition and proves the instrument to be invalid. Additional practical limitations of the approach are given by the fact that instruments based on family relations lead to a considerable reduction of sample sizes. Brunello and D'Hombres (2007) try to circumvent the data limitations in the ECHP by taking the average BMI of parents and siblings. While still reducing the sample size considerably (by excluding households without parents or siblings currently alive), the informational content of the instrument varies from individual to individual. A new possiblility to deal with this problems seems to be the use of genetic information. Norton and Han (2008) and Ding, Lehrer, Rosenquist and Audrain McGovern (2009) show first promising results regarding the explanation of obesity, even if they still face the problem that some of the genetic markers which influence weight may also be influencing characteristics related to labour market outcomes. Additionaly, datasets which include genetic information have small observation numbers and are rarely available. It is due to the methodological problems associated with the IV approach and the data limitations that we follow García and Quintana-Domeque (2007) and Sousa (2005) and refrain from following the IV approach in order to investigate the relation between body mass and wages with ECHP data. Sousa (2005) applies a propensity score approach instead, which relies on strong distributional assumptions and on the choice of the covariates included in the propensity score model.

Given the comparatively short time span of the ECHP data providing information on body mass and the limitations in sample sizes as well as the strong assumptions associated with the instrumental variable and propensity score approaches, we think that the relation between BMI and wages is best identified with cross-sectional variation. We will therefore report results for estimates of between effects models. For comparison, we provide results of the estimation of a fixed effects model in the appendix. However, we will be careful when interpreting any significant correlation as causal relation between weight and wages.

Peers' body mass and the concept of an optimal BMI

Our central approach includes dummies for deviations from the social norm BMI as well as for deviations from the optimal BMI in a clinical sense in a wage regression. Finding a significant effect for the influence of a deviation from the social norm governing BMI while controlling for the clinical dummies, would indicate an influence of the social norm. We take the gender and broad age group specific median BMI for each broad region within a country and observation year as the prevalent social norm for the weight-height relation for the individual. This approach is related to the approach formulated in Alessie and Kapteyn (1991). According to this approach, a set of people who share certain characteristics form a *social group* and the social group to which an individual belongs to, could serve as a proxy for his or her reference group.

Deviations from a social norm are represented in our preferred specification in Equation (1) by two dummy variables for a deviation from peers' body mass credited to the fact that a body mass index above the social norm might have different wage effects than a body mass below the social norm.

$$
\ln W_{it} = \beta_0 + X_{it}\beta_1 + ([BMI_{it} < MEDIANBMI_{it} - 3] = 1)\gamma_1^{norm}
$$
$$
+([BMI_{it} > MEDIANBMI_{it} + 3] = 1)\gamma_2^{norm}
$$
$$
+([BMI_{it} < 20] = 1)\gamma_1^{medic} + ([BMI_{it} > 26] = 1)\gamma_2^{medic} + \varepsilon_{it} \ . \qquad (1)
$$

In particular, we identify with γ_1^{norm} a BMI which is more than three index points *below* peers' BMI and with γ_2^{norm} a BMI which is more than three index points *above* peers' BMI. To make our identification strategy valid, it is necessary to use a fixed value for the deviation. The definition of the relevant deviation from the respective body mass reference value by three index points is owed to the fact that three index points are approximately the average standard deviation from the mean body mass within countries as displayed in Table 1.

Table 1 lists the mean, minimum and maximum of the within country body mass norms which are calculated by gender, age group[4], and region specific median BMI. The number of different cells mainly reflects the level of regional disaggregation for the respective country. It gets down to 12 different cells for men and women in Denmark, where no regional information is available, representing median values for the 3 different age groups in the 4-year-sample for men and women, respectively. Owing to the small number of definable social groups in Denmark, we will be particularly cautious when evaluating the results for this country.

We observe a huge variation in the social norm body mass when inspecting the minimum and maximum values of the social norm body mass within countries. In addition the country-specific mean of norm BMI varies between countries, the differences are however moderate. The mean of the standard deviation, where the standard deviation refers to the mean of the standard deviation of the body mass per observation cell, is higher for women than for men and differs considerably between countries.

[4] The three broad age groups are 19 to 24, 25 to 34 and 35 to 44.

Table 1: Descriptive statistics for gender and broad age group specific median of the BMI for each region and observation year

Men					
	Mean	Min	Max	Mean of Standard Deviation	No. of different cells
Austria	24.50	22.46	25.79	3.14	34
Belgium	24.17	20.98	25.00	3.50	33
Denmark	24.56	22.86	25.18	3.49	12
Finland	24.69	21.94	26.04	3.39	54
Greece	25.31	23.06	26.30	2.94	31
Ireland	25.20	21.33	26.88	3.10	18
Italy	24.25	21.33	26.09	3.09	105
Portugal	24.83	22.53	26.40	2.94	72
Spain	25.08	21.97	27.58	3.48	78

Women					
	Mean	Min	Max	Mean of Standard Deviation	No. of different cells
Austria	22.18	20.57	23.15	3.56	30
Belgium	22.03	19.61	23.42	3.86	35
Denmark	22.82	21.97	23.31	3.96	12
Finland	23.11	20.70	24.43	3.98	54
Greece	22.78	20.20	25.83	3.62	40
Ireland	23.14	21.20	24.56	3.65	22
Italy	21.68	19.63	23.88	3.25	100
Portugal	23.29	20.94	26.56	3.64	74
Spain	22.06	19.66	24.24	3.45	76

ECHP data, years 1998-2001. For details on the selected sample see text. The information is displayed for the sample as used in the regressions (observation numbers see Table 2). The unit of observation is the peer group. The standard deviation refers to the standard deviation of the mean BMI within a peer group.

Deviations from medical recommended BMI are modeled analogically. γ_1^{medic} and γ_2^{medic} describe deviations of more than three index points from an clinically optimal BMI of 23. Negative values for γ_1^{medic} identify expected negative productivity effects stemming from expected future health limitations of a lower than the optimal body mass while controlling for current health status. Further, γ_2^{medic} identifies the productivity effect of a higher than optimal body mass.

In medical scholarly journals there has been some discussion on the optimal BMI value from a health perspective. According to Calle, Thun, Petrelli, Rodriguez and Heath (1999), the age standardized mortality rate controlled for smoking behavior and any history of disease for white men and women was lowest for a BMI in the range 22.0 – 24.9. Willett, Dietz and Colditz (1999) report empirical evidence that the risk of different diseases like hypertension and coronary heart disease begins to increase at BMIs > 22 – 23. In a meta-analysis including 97 studies, Flegal, Kit, Orpana and Graubard (2013) show that hazard ratios of all-cause mortality is lowest for people with BMIs between 25 and 30. Wannamethee, Shaper, Walker and Ebrahim (1998) found for a sample of British men that the 15-year survival, free of heart attack, stroke, and diabetes, is highest for those with a BMI between 22.0 and 23.9. This is in line with the recommendation of a median BMI in the range 21 - 23 as the target value for an optimum balancing of the hazards associated with both underweight and overweight WHO (2000). We therefore take an BMI of 23 as optimal.[5]

In the following, we report the weight associated with the average height of men and women in Europe to give an impression about the weight and the weight deviations associated with an optimal BMI of 23 and the deviation of three BMI points. BMI of 20, 23 and 26 for a given height of 1.80 meters are associated with a body weight of 64.80 kg, 74.52 kg, and 84.24 kg, respectively; the corresponding BMI for a given height of 1.65 meters are associated with a body weight of 54.54 kg, 62.62 kg, and 70.79 kg, respectively.

[5] As we consider a sample of men and women in the age range between 19 and 44 for our study, we do not need to take higher BMI due to increasing age into account. One should be aware that the validity of the BMI to measure obesity and predict the associated risk of cardiovascular events and total mortality is challenged by recent evidence (Romero-Corral, Montori, Somer, Korinek, Thomas, Allison, Mookadam and Lopez-Jimenez, 2006). Still, the identification of underweight and other weight-related diseases by means of body mass information is not taken into question. Besides, our approach relies on a body fat measure related to physical appearance to be observable by peers and employers.

Figure 1: Example of the identification strategy using the example of an upward deviation of Spanish men

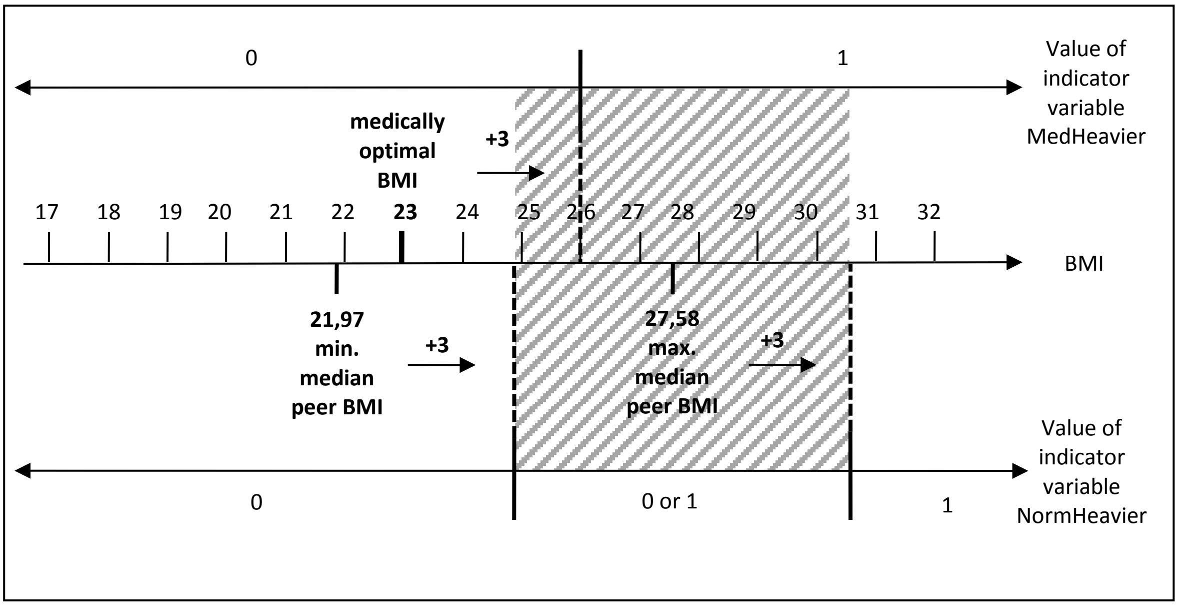

Figure 1 displays our identification strategy using the example of Spanish men in a BMI range *above* the medically recommended or social norm BMI, so we are looking at an upward deviation. Here, one can see that disentangling productivity effects from norm effects with estimations of Equation (1) is only possible in the shaded area, i.e. in a range where values for medically optimal BMI and norm BMI differ. In the example regarding Spanish men, this is the case for a BMI between 24.97, the upper bound of the minimal median peer group BMI, and 30.58, the upper bound of the maximum median peer group BMI. Now, we can identify a norm effect, if the BMI is above 24.97 but below 26 (the upper bound of the medically optimal BMI), and we can identify a productivity effect, if the actual BMI ist above 26 but below 30.58. Because the social norm BMI is defined relative to the peer group, the identification of a productivity or social norm effect for a given BMI depends on the median peer BMI in the respective peer group. While those with a BMI well above both the optimal and social norm BMI might also face wage penalties or premia, we will not be able to identify these effects with our empirical strategy.

Bearing this and the ceteris paribus assumption in mind, we consider a social norm effect as identified if we find a significant effect for deviation from peer group median BMI when estimating Equations (1). Analogously, a productivity effect is identified in the case that a significant effect for deviation from medical optimal BMI is observable in the estimation of Equations (1). As mentioned above, we are aware that our approach is not capable of identifying or disentangling wage effects for people with very high or very low BMIs. In principal, this might provide a potential bias in our findings. But for three reasons this does not derogate our findings much. First, it is our aim to show that an influence of social norms on wages exists alongside the productivity effect. Second, this only concerns a very small amount of the observations in our sample. Third, and even more important, these effects would even augment our findings based on estimates of Equation (1). Therefore, our findings only mark the lower limit of the real productivity and social norm effects.

3 DATA AND SAMPLE

The data source for this study is the anonymized user database (UDB) of the European Community Household Panel (ECHP) which provides standardized data for most of the European countries (see Peracchi (2002)). This data set has also been used by Brunello and D'Hombres (2007), Sousa (2005) and García and Quintana-Domeque (2007) in studies on the relation between overweight and earnings in Europe.

Of particular interest for the purpose of the present study is the fact that the ECHP has a longitudinal panel design and the information on weight and height of individuals is available for the countries Denmark, Belgium, Ireland, Italy, Greece, Spain, Portugal, Austria and Finland for the years 1998 to 2001. For this reason, we restrict our analysis to this time span.

We calculate the body mass index using information on self-reported height and weight. This embodies the problem that this information is measured with error. The standard result for coefficients of explanatory variables which are measured with error is that the coefficients will be biased towards zero. We try to minimize this error by dropping observations from individuals for whom self-reported height changes by more than 2 centimeters from one year to another. The procedure suggested by Cawley (2004) to correct for the measurement error is not applicable, due to the lack of other data providing information on body mass for European countries. However, Cawley (2000) reports that his findings do not change whether he corrects for self-reported BMI in his data or not. A particular problem in the presence of norms regarding body mass is the possibility of a systematic misreporting of weight and height to pretend to have a physical stature closer to the norm. However, in this case any impact of deviations from the social norm regarding body mass on wages would represent a lower bound of the true effect.

The dependent variable in the wage regressions is the natural logarithm of hourly wages, where wages are deflated by consumer price index information. The set of explanatory variables includes beside the indicator variables for deviations from optimal or peers' BMI: age, square of age, indicators for highest level of general or higher education completed, an indicator for marital status[6], tenure, indicators for part-time job and permanent contract, number of days due to illness in the last four weeks before the interview, an indicator for subjective assessment on being hampered in daily work by any physical or mental illness or disability, and nine indicators for occupational groups and regional controls. The degree of regional information varies from country to country and is not available for Denmark. For women, an indicator for the presence of children in the household is also included to account for past pregnancies. A list of all variables used in the analysis is reported in Table A1 in the appendix.

We account for the fact that weight tends to rise with age in two ways. First, we restrict our sample to workers between 19 and 44 to ensure that individuals are at their adult height and to restrict age-related weight increase, like that for women around the years of the menopause.[7] Second, we include linear and quadratic measures of age as explanatory variables in the wage regression.

As common in the literature, we investigate the labor outcomes of men and women separately. Because the European countries are characterized by very different institutions governing wage setting and because the influence of the social norm on the weight-height relation might differ between European countries, we estimate all regressions separately for the countries in the data set. The wage information for the self-employed is not available in a manner comparable to the employed workers. Our

[6] There are also some recent studies e. g. Chiappori, Oreffice and Quintana Domeque (2012) and Brown (2011), which focus on the interdependencies of marriage, wages and weight.

[7] For information on the interaction between weight and wage for older workers in Europe see Lunhdborg, Bolin, Höjgård and Lindgren (2007).

analysis will therefore be restricted to those not working in self-employment. Wage regressions are conducted for men and women working more than 15 hours a week.

4 RESULTS

Table 2 lists the average logarithmic hourly wages for those within the range of the clinically optimal BMI and the BMI of their peer group, respectively, as well as the average for those being more than three index points below or above the respective reference value for each country for men and women. For men, we observe that workers in the range of a healthy BMI earn higher wages than unhealthily thin or overweight workers in five out of nine countries, while having a BMI in the range of the social norm is rewarded with higher wages in six out of nine countries. However, differences in logarithmic wages are small.

Similar to men, having a clinically recommended body mass leads to higher wages for female workers in six out of nine countries. This is different for the wages of women in the range of the social norm BMI compared to the wages of deviators in body mass. Here, higher wages are found in only two out of nine countries. At this stage, we can neither say whether wage differences are significant, nor are we able to disentangle any productivity effects from effects of the social norm. The numbers in italics give the percentage of workers observed in the respective groups. The group with a body mass below the clinically recommended range is very small for men. In all countries as well as for both sexes there are considerable fractions in the range of the social norm body mass and above. However, the distribution between countries differs considerably.

Table 2: Average logarithmic hourly wages for those deviating from optimal BMI or peer group BMI.

Men							
	Deviations from optimal BMI			Deviations from social norm BMI			Obser-vations
	BMI < 20	20 ≤ BMI ≤ 26	BMI > 26	BMI < Norm-BMI – 3	Norm-BMI – 3 ≤ BMI ≤ Norm-BMI + 3	BMI > Norm-BMI + 3	
Austria	4.78 (2.3 %)	4.90 (56.9 %)	4.88 (40.8 %)	4.95 (8.5 %)	4.90 (63.4 %)	4.83 (28.1 %)	3823
Belgium	5.93 (4.4 %)	6.11 (49.6 %)	6.05 (46.0 %)	6.08 (10.9 %)	6.12 (51.6 %)	6.02 (37.5 %)	1532
Denmark	4.68 (2.4 %)	4.83 (52.4 %)	4.80 (45.2 %)	4.79 (11.0%)	4.84 (56.6 %)	4.77 (32.4 %)	2576
Finland	3.94 (2.6 %)	4.12 (57.7 %)	4.11 (39.7 %)	4.08 (10.9 %)	4.13 (63.5 %)	4.08 (25.6 %)	3302
Greece	6.82 (0.9 %)	7.24 (31.8 %)	7.25 (67.3 %)	7.24 (5.6 %)	7.29 (42.2 %)	7.21 (52.2 %)	3567
Ireland	1.63 (1.8 %)	1.97 (26.6 %)	1.97 (71.6 %)	1.94 (6.1 %)	2.03 (35.2 %)	1.93 (58.7 %)	2511
Italy	2.51 (2.9 %)	2.64 (64.5 %)	2.65 (32.6 %)	2.60 (7.3 %)	2.65 (71.0 %)	2.62 (21.7 %)	6583
Portugal	6.27 (2.1 %)	6.36 (50.2 %)	6.40 (47.7 %)	6.39 (9.2 %)	6.39 (58.9 %)	6.36 (31.9 %)	6038
Spain	6.78 (1.2 %)	6.92 (26.5 %)	6.82 (72.3 %)	6.96 (5.5 %)	6.94 (32.1 %)	6.79 (62.4 %)	7058

Women							
	Deviations from optimal BMI			Deviations from social norm BMI			Obser-vations
	BMI < 20	20 ≤ BMI ≤ 26	BMI > 26	BMI < Norm-BMI – 3	Norm-BMI – 3 ≤ BMI ≤ Norm-BMI + 3	BMI > Norm-BMI + 3	
Austria	4.70 (17.8 %)	4.70 (56.7 %)	4.72 (25.5 %)	4.77 (8.5 %)	4.70 (62.3 %)	4.71 (29.2 %)	2531
Belgium	5.99 (18.0 %)	6.04 (57.5 %)	5.96 (24.5 %)	5.99 (8.2 %)	6.04 (63.2 %)	5.96 (28.6 %)	1386
Denmark	4.73 (11.3 %)	4.72 (55.6 %)	4.67 (33.1 %)	4.76 (10.4 %)	4.72 (55.1 %)	4.67 (34.5 %)	2250
Finland	3.93 (12.4 %)	4.01 (60.0 %)	3.95 (27.6 %)	4.01 (12.5 %)	4.00 (60.5 %)	3.94 (27.0 %)	2873
Greece	7.16 (9.9 %)	7.24 (39.6 %)	7.19 (50.5 %)	7.24 (8.1 %)	7.22 (41.8 %)	7.18 (50.1 %)	2516
Ireland	1.81 (6.1 %)	1.92 (33.1 %)	1.84 (60.8 %)	1.94 (6.4 %)	1.90 (33.3 %)	1.84 (60.3 %)	1997
Italy	2.58 (24.2 %)	2.62 (60.5 %)	2.55 (15.3 %)	2.58 (7.6 %)	2.61 (71.9 %)	2.55 (20.5 %)	4343
Portugal	6.34 (9.6 %)	6.34 (55.9 %)	6.22 (34.5 %)	6.53 (11.0 %)	6.30 (57.2 %)	6.23 (31.8 %)	4296
Spain	6.78 (10.7 %)	6.82 (32.5 %)	6.66 (56.8 %)	6.90 (5.0 %)	6.80 (36.5 %)	6.67 (58.5 %)	4176

The wage is measured in local currencies. Averages of logarithmic wages between countries should not be compared. The optimal BMI in a clinical sense is defined by a BMI of 23, see text for more details. The norm BMI is given by the median BMI value of the social comparison group, see text for more details.

Results for our preferred specification, the between-effects model, are presented in Table 3. Each line represents a separate estimation of the wage regression as stated in Equation (1) for one country. The upper panels present estimates for men and the lower panels for women. The included control variables are listed in Table A1 in the appendix and are discussed in section 3 as well as the sample restrictions. We will not discuss the coefficient estimates for other variables but the indicator variables identifying productivity effects associated with deviations from the clinically recommended BMI – MedLighter (below BMI of 20) and MedHeavier (above BMI of 26) – and those identifying deviations from the norm – NormLighter (below peer group median BMI - 3) and NormHeavier (above peer group median BMI + 3) – in detail. Furthermore, because we estimate various regressions which implies the testing of various hypotheses we will only interpret effects that are significant at the 5-percent level or above to address the problem of multiple comparisons.

Let us now take a look at the estimations in Table 3. Before we turn to the particular significant effects in detail, there are three interesting observations. First, significant coefficients for deviations from the reference BMI (medical optimal or social norm) indicate wage penalties, not wage premiums. Second, wage penalties for deviations from the norm occur rather for an upward deviation from the reference BMI than for a downward deviation. We only observe one case with significantly lower wages for those below the norm in the case of Finish men while we find three significant coefficients indicating a penalty for being overweight. Third, wage penalties, again for deviations from the norm, seem to be an issue rather for men than for women. Here we find no significant effects for women, but four for men who deviate from social norm BMI. This is surprising in the light of the existing evidence in the literature on the weight-wage relation. In particular, in Austria men incur a wage penalty of seven percent, in Greece 7.6 percent, and in Spain 6.8 percent for being more than three index points above the norm.

Table 3: Estimates of wage effects for deviations of more than three index points from medically recommended and peer group median BMI in Europe

Men						
	MedLighter (0/1)	MedHeavier (0/1)	NormLighter (0/1)	NormHeavier (0/1)	R^2 (between)	Observations
Austria	-0.047 (0.068)	0.040 (0.030)	0.017 (0.038)	-0.070* (0.031)	0.343	3823
Belgium	-0.055 (0.059)	-0.020 (0.038)	-0.015 (0.040)	-0.026 (0.038)	0.418	1532
Denmark	-0.002 (0.074)	-0.068 (0.035)	-0.061 (0.037)	0.017 (0.035)	0.376	2576
Finland	-0.034 (0.069)	-0.026 (0.030)	-0.075* (0.035)	0.018 (0.032)	0.441	3302
Greece	-0.301** (0.110)	0.014 (0.031)	-0.019 (0.050)	-0.076** (0.027)	0.535	3567
Ireland	-0.293* (0.115)	0.063 (0.049)	0.067 (0.067)	-0.051 (0.041)	0.488	2511
Italy	-0.041 (0.043)	0.009 (0.020)	-0.026 (0.029)	0.002 (0.023)	0.459	6583
Portugal	-0.011 (0.067)	0.020 (0.025)	0.011 (0.035)	-0.004 (0.025)	0.491	6038
Spain	-0.062 (0.066)	0.052 (0.027)	0.067 (0.036)	-0.075** (0.023)	0.524	7058

Women						
	MedLighter (0/1)	MedHeavier (0/1)	NormLighter (0/1)	NormHeavier (0/1)	R^2 (between)	Observations
Austria	-0.002 (0.043)	-0.021 (0.066)	0.048 (0.059)	0.046 (0.065)	0.349	2531
Belgium	-0.002 (0.036)	0.030 (0.055)	-0.055 (0.050)	-0.035 (0.053)	0.423	1386
Denmark	0.011 (0.080)	-0.043 (0.076)	0.027 (0.083)	0.038 (0.076)	0.495	2250
Finland	-0.064 (0.044)	-0.052 (0.048)	0.066 (0.044)	0.011 (0.047)	0.473	2873
Greece	0.014 (0.051)	-0.047 (0.075)	-0.045 (0.057)	0.038 (0.075)	0.646	2516
Ireland	-0.185* (0.079)	-0.124 (0.104)	0.140 (0.079)	0.109 (0.104)	0.659	1997
Italy	-0.044* (0.021)	-0.006 (0.037)	-0.003 (0.032)	-0.029 (0.035)	0.517	4343
Portugal	-0.059 (0.042)	-0.025 (0.045)	0.061 (0.042)	0.023 (0.046)	0.683	4296
Spain	-0.034 (0.038)	-0.010 (0.067)	0.089 (0.053)	-0.040 (0.068)	0.635	4176

Estimates of a between-effects model. Robust standard errors are in parentheses. The dependent variable is the logarithm of hourly wages. The variable MedLighter indicates a BMI < 20 and MedHeavier a BMI > 26. The variable NormLighter indicates a BMI which is more than three index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI which is more than three index points higher than the respective peer group body mass. Each line represents a separate regression. See text for more information on other variables included in the regressions. Significance at the 5 % , 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

The only wage effects for being more than three index points below the norm is found in Finland. The significant wage penalty of 7.3 for downward deviators in Finland is about the same size as the penalties for upward deviators in Austria, Greece and Spain.

We need to view our results for negative productivity effects for deviating from the medically recommended BMI with caution, because they are only identified by a small fraction of the total sample sizes. For men, 0.9 percent of the sample in Greece and 1.8 percent of the sample in Ireland identify huge wage penalties of about 30 percent lower hourly wages for being underweight. As stated above, we cannot disentangle norm from productivity effects at such extreme areas of the weight distribution. Even so, one can assume that these effects are potentially driven by seriously underweight individuals signaling a long term productivity disadvantage through their body mass. For women, we only find two significant effects in Ireland and Italy. Irish women receive an 18.5 percent lower hourly wage for being below the clinically recommended body mass in Table 3 which covers six percent of all women in the sample for Ireland. The wage penalties for Italian underweight women is 4.4 percent, which covers about 24 percent of the Italian women.

We run several robustness checks for the estimates of our preferred specification of which the most important ones are reported in the appendix. First, we address the problem of harmful correlations between the indicator variables for deviations from medically recommended and social norm BMI. All correlations between the indicator variables are reported in Table A2. As expected, we find significant positive correlations between the indicator variables for deviation from medically recommended and social norm BMI for all countries as well as for both genders which go in the same direction. Significant negative correlations are found between the variables that indicate deviations in opposite directions. As a next step to validate our findings from our preferred specification, we reestimate the wage regression twice, once only with the variables for deviation from peer group median BMI and once only with those for deviation from medically recommended BMI.[8] The results of these estimations are reported in Table A3 and Table A4, respectively. Here again, we find that deviations from the reference BMI indicate wage penalties, which occur rather for an upward deviation than for a downward

[8] The remaining control variables were the same as reported in the data section.

one, and that this is the case rather for men than for women. The effects for upward deviations from the norm in Table A3 are more pronounced in significance and effect size than the ones for upward deviations from the medically recommended BMI which explains why the norm effects dominate in the results for the joint specification reported in Table 3. Fixed effects estimates are reported in Table A5 for deviations of more than three index points from the peer group mean BMI and the medically optimal BMI. The values for the between R-squared as reported in Table 3, A3, and A4 are well above the values for the within R-squared in all regressions, as reported in Table A5. According to these estimates, only the finding for Austria is robust when applying the fixed effects estimator. However, the within estimates are based on little information (four years) and the comparison of the R-squared values clearly indicate that most of the variation is cross-sectional. We therefore do not discuss the findings for the fixed effects model in detail.

We also run a between-effects estimation where we define deviations from the reference BMI value by deviations of more than one standard deviation from the mean body mass index of the peer group. The results of these estimations are shown in Table A6. The downside of this more adequate specification of deviations from the norm is the fact that it does not make sense to let the deviation from the clinically optimal BMI vary with the distribution of body mass in the social group. We therefore limit this robustness check to deviation from median peer group BMI. The results for being slimmer than the norm are similar to the results in Table 3 and A3 for both sexes. Most importantly, we found significant wage penalties for men above the social norm for all countries as in Table A3 except for Austia. For Austria the other country the level of significance of the coefficient is little beneath our lowest reported level of significance of five percent. Compared to our preferred specification, the wage penalties for heavier men in Greece and Spain are lower in these estimates. Although these estimates do not allow for disentangling productivity effects from the influence of the social norm, the results which use the standard deviation as the definition of the relevant BMI deviation provide corroborative evidence that the results displayed in Table 3 are not driven by the concept of a norm deviation favored in the preferred specification.

Finally, we run between-effects estimations when unhealthy body weight and deviations from the norm are defined by deviations of more than 1.5 or five index points from the clinically recommended BMI or peer group median BMI, respectively. In Table A7 the results of the estimates for a deviation of more than 1.5 index points are reported. For men again, we find wage penalties for an upward deviation from the norm BMI in Greece and Spain of 10 and 6 percent lower wages, respectively. Additionally, we find a wage penalty of about ten percent for Danish men, who are heavier then their peers and wage premia of ten and 16 percent for men in Austria and Ireland who are thinner than their peers. Men being lighter than medical optimal again incur wage penalties in Greece and Ireland of 22 and 27 percent, respectively. Additionally, men in Finland and Italy are punished for being lighter than medically optimal with wage cuts of about eleven and six percent, respectively while men in Austria enjoy a wage premium of seven percent if they are heavier than medically optimal. For women, we find three new effects. In Belgium and Italy, women who are lighter than their peers experience wage cuts of ten and four percent, respectively, and Greek women yield twelve percent lower hourly wages for being lighter than medically recommended. The identification in the estimations of the five index points deviation in Table A8 is confined to much less individuals than in the case of deviations of tree or 1.5 index points which explains the differences in the results. We find a highly significant penalty of about ten percent lower wages for those men well above the social norm in Greece and huge wage penalties of about 20 percent and 35 percent respectively, for those deviating more than five index points in the downward direction in Belgium and Greece. The latter effects have not been present when defining the relevant deviation by a deviation of tree or more index points.

5 CONCLUSION

In economics, social norms are typically considered as the residual part of observed behavior which cannot be explained by economic theory. Empirical studies which quantify any effects of social norms are rare. In this paper, we suggest wage sanctions associated with deviations from a social norm on body mass as an avenue to quantify the effects of social norms. Our empirical strategy allowed to show the existence of an influence of social norms on wages in Europe. For some sections of the weight distribution, we are able to disentangle wage effects of deviations from the social norm from a wage reduction incurred by the employee for an anticipated lower future productivity. To this end, we compare wage effects of deviations from a social norm as measured by the median BMI of the relevant peer group with wage effects of deviations from a medical optimal BMI. We argue that the future productivity could be foreseen by the health risk associated with deviations from an optimal BMI in a clinical sense. We are able to conduct these estimates with standardized data for nine European countries along with detailed controls for present health limitations among others. Our results suggest that social norms set the relevant standard to evaluate men's physical appearance in Austria, Finland, Greece, and Spain. In particular, deviations of more than three index points in body mass in the upward direction from the norm is sanctioned with around seven percent lower hourly wages in Austria, Greece, and Spain. However, as extensively discussed above, given the limitations of the available data and our empirical approach, we cannot provide compelling evidence that the correlations reflect causal relationships between body mass and wages. A puzzling result compared to the findings in the literature is the observation that rather men than women incur wage penalities for being overweight. A possible explanation is that our estimation strategy is prone to fail, if the social norm body mass is embodied by an ideal body mass rather than a peer group median body mass. Further qualitative research needs to explore whether there are gender related differences in the relevant peer group body mass.

The findings in this paper are important in two dimensions. First, from a more general point of view, the evidence presented in this paper is surprising and disturbing at the same time. Social norms seem to play an important role. For some countries, even comparatively moderate deviations from a norm on body mass lead to substantially lower hourly wages. To answer the question what particular characteristics are responsible for the effects in these countries, one could hypothesize that the cultural or institutional context has a moderating effect on the relationship between norm deviation and wages. This should raise awareness to many other factors potentially influencing wage setting and employment relations which have not been considered so far. However, to investigate these factors would go beyond the scope of this paper and is left for further research.

Second, the paper contributes novel insights to the literature on the weight-wage relation. In contrast to the findings in the recent literature, a negative relation between body mass and wages is neither confined to severe obese employees nor to women alone. There is not one body mass-wage relation for the Western world. Our findings provide evidence that the body mass-wage relation is non-linear in many countries. While the findings differ substantially between countries, the negative association between wages and indicators for a higher or lower body mass index than the reference point (as set by the norm or a clinically recommended BMI) is rather confined to men. Given the problems related to the identification of causal effects of body mass on wages as pointed out above, additional research is required to get even closer to the true effect of body mass on wages.

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APPENDIX

Table A1: List of used variables

Name	Type	Description
Ln(wage)	dependent	Natural logarithm of hourly wages where wages are deflated by consumer price index information.
MedLighter	independent	Dummy = 1 if individuals BMI is more than tree index points below medically recommended BMI.
MedHeavier	independent	Dummy = 1 if individuals BMI is more than tree index points above medically recommended BMI.
NormLeighter	independent	Dummy = 1 if individuals BMI is more than tree index points below social norm BMI, constituted by individuals peer group.
NormHeavier	independent	Dummy = 1 if individuals BMI is more than tree index points above social norm BMI, constituted by individuals peer group.
Age	control	Age in years.
Age^2	control	Spare of age in years.
Educat	control	Dummies for highest level of education (recognized third level education; second stage of secondary level education; less than second stage of secondary level education).
Married	control	Dummy = 1 if individual is married.
Children	control	Dummy only for women to control for past pregnancies.
Tenure	control	Tenure in month. Variable is top coded at 160 for all individuals with tenure equal or above 160 month, due to the available data in the ECHP.
Parttime	control	Dummy = 1 if individual is working part time.
Permcontract	control	Dummy = 1 if individual has permanent contract.
Absence	control	Number of days of absence due to illness in the last four weeks.
Badhealth	control	Dummy = 1 if individual states to be hampered in daily activities by physical or mental health problems, illnesses or disabilities.
NEOccup1-8	control	Dummies for occupational groups (legislators, senior officials and managers; professionals; technicians and associate professionals; clerks; service workers and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations).
Yeardum	control	Dummies to control for the year of the survey (2001, 2000, 1999, 1998).
Region	control	Dummies for NUTS 1 regions (number of regions varies depending on examined country).

Table A2: Pair wise correlations between indicator variables for deviations of more than three index points from medically recommended BMI and social norm BMI

Men			
		MedLighter (0/1)	MedHeavier (0/1)
Austria	NormLighter (0/1)	0.4559	-0.2602
	NormHeavier (0/1)	-0.0961	0.7382
Belgium	NormLighter (0/1)	0.5510	-0.3209
	NormHeavier (0/1)	-0.1766	0.8182
Denmark	NormLighter (0/1)	0.4359	-0.3208
	NormHeavier (0/1)	-0.1066	0.7624
Finland	NormLighter (0/1)	0.4303	-0.2873
	NormHeavier (0/1)	-0.0983	0.7120
Greece	NormLighter (0/1)	0.3581	-0.3612
	NormHeavier (0/1)	-0.0919	0.7105
Ireland	NormLighter (0/1)	0.4571	-0.4154
	NormHeavier (0/1)	-0.1552	0.7328
Italy	NormLighter (0/1)	0.5477	-0.2052
	NormHeavier (0/1)	-0.0928	0.7380
Portugal	NormLighter (0/1)	0.4357	-0.3021
	NormHeavier (0/1)	-0.0944	0.7081
Spain	NormLighter (0/1)	0.4046	-0.3967
	NormHeavier (0/1)	-0.1350	0.8025

Women			
		MedLighter (0/1)	MedHeavier (0/1)
Austria	NormLighter (0/1)	0.6269	-0.1734
	NormHeavier (0/1)	-0.2993	0.8925
Belgium	NormLighter (0/1)	0.5999	-0.1696
	NormHeavier (0/1)	-0.3130	0.8961
Denmark	NormLighter (0/1)	0.9014	-0.2397
	NormHeavier (0/1)	-0.2654	0.9552
Finland	NormLighter (0/1)	0.6738	-0.2338
	NormHeavier (0/1)	-0.2387	0.8831
Greece	NormLighter (0/1)	0.6323	-0.2879
	NormHeavier (0/1)	-0.3243	0.9444
Ireland	NormLighter (0/1)	0.7213	-0.3151
	NormHeavier (0/1)	-0.3072	0.9652
Italy	NormLighter (0/1)	0.4804	-0.1228
	NormHeavier (0/1)	-0.2854	0.8260
Portugal	NormLighter (0/1)	0.5880	-0.2523
	NormHeavier (0/1)	-0.2269	0.8778
Spain	NormLighter (0/1)	0.5847	-0.2606
	NormHeavier (0/1)	-0.4110	0.9553

MedLighter indicates a BMI < 20 and MedHeavier a BMI > 26. NormLighter indicates a BMI more than three index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI more than three index points higher than the respective peer group body mass. All pair-wise correlations are significant at any levels of significance.

Table A3: Wage effects for deviations of more than three index points from peer group median BMI in Europe.

Men				
	NormLighter (0/1)	NormHeavier (0/1)	R^2 (between)	Observations
Austria	-0.006 (0.032)	-0.037* (0.019)	0.342	3823
Belgium	-0.032 (0.032)	-0.042* (0.021)	0.417	1532
Denmark	-0.044 (0.031)	-0.039 (0.021)	0.373	2576
Finland	-0.077** (0.029)	-0.003 (0.021)	0.440	3302
Greece	-0.082 (0.043)	-0.068*** (0.018)	0.532	3567
Ireland	-0.041 (0.055)	-0.009 (0.026)	0.484	2511
Italy	-0.044 (0.023)	0.010 (0.013)	0.458	6583
Portugal	-0.002 (0.028)	0.011 (0.017)	0.491	6038
Spain	0.033 (0.030)	-0.038** (0.013)	0.523	7058

Women				
	NormLighter (0/1)	NormHeavier (0/1)	R^2 (between)	Observations
Austria	0.047 (0.042)	0.027 (0.023)	0.349	2531
Belgium	-0.056 (0.036)	-0.008 (0.021)	0.423	1386
Denmark	0.037 (0.025)	-0.005 (0.016)	0.495	2250
Finland	0.020 (0.027)	-0.033 (0.019)	0.471	2873
Greece	-0.031 (0.041)	-0.008 (0.020)	0.646	2516
Ireland	-0.004 (0.048)	-0.006 (0.023)	0.656	1997
Italy	-0.042 (0.027)	-0.023 (0.017)	0.516	4343
Portugal	0.027 (0.032)	0.003 (0.020)	0.683	4296
Spain	0.059 (0.041)	-0.045** (0.016)	0.635	4176

Estimates of a between-effects model. Robust standard errors are in parentheses. The dependent variable is the logarithm of hourly wages. NormLighter indicates a BMI more than three index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI is more than three index points higher than the respective median of the peer group body mass. Each line represents a separate regression. See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

Table A4: Wage effects for deviations of more than three index points from medically recommended BMI in Europe.

Men				
	MedLighter (0/1)	MedHeavier (0/1)	R^2 (between)	Observations
Austria	-0.028 (0.058)	-0.016 (0.017)	0.341	3823
Belgium	-0.067 (0.049)	-0.039* (0.020)	0.417	1532
Denmark	-0.062 (0.064)	-0.043* (0.019)	0.374	2576
Finland	-0.103 (0.060)	-0.001 (0.019)	0.439	3302
Greece	-0.319** (0.099)	-0.048* (0.019)	0.532	3567
Ireland	-0.241* (0.101)	0.005 (0.028)	0.487	2511
Italy	-0.064 (0.034)	0.012 (0.012)	0.459	6583
Portugal	-0.001 (0.057)	0.015 (0.015)	0.491	6038
Spain	-0.009 (0.059)	-0.029* (0.014)	0.522	7058

Women				
	MedLighter (0/1)	MedHeavier (0/1)	R^2 (between)	Observations
Austria	0.019 (0.030)	0.022 (0.025)	0.348	2531
Belgium	-0.026 (0.026)	-0.003 (0.022)	0.422	1386
Denmark	0.034 (0.024)	-0.006 (0.016)	0.495	2250
Finland	-0.013 (0.027)	-0.046* (0.019)	0.471	2873
Greece	-0.014 (0.037)	-0.008 (0.020)	0.645	2516
Ireland	-0.076 (0.047)	-0.024 (0.022)	0.658	1997
Italy	-0.042* (0.017)	-0.033 (0.019)	0.517	4343
Portugal	-0.022 (0.032)	-0.010 (0.019)	0.683	4296
Spain	0.008 (0.029)	-0.049** (0.017)	0.635	4176

Estimates of between-effects models. Robust standard errors are in parentheses. The dependent variable is the logarithm of hourly wages. MedLighter indicates a BMI < 20 and MedHeavier a BMI > 26. Each line represents a separate regression. See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

Table A5: Fixed effects estimates of wage effects for deviations of more than three index points from medically recommended and peer group median BMI in Europe

Men						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (within)	Observations
Austria	0.017 (0.040)	0.012 (0.015)	-0.012 (0.021)	-0.039* (0.018)	0.094	3823
Belgium	-0.152* (0.070)	0.054 (0.036)	-0.047 (0.046)	-0.114*** (0.040)	0.132	1532
Denmark	0.046 (0.052)	0.016 (0.022)	0.003 (0.030)	0.012 (0.025)	0.092	2576
Finland	-0.018 (0.049)	0.025 (0.023)	-0.008 (0.032)	-0.018 (0.026)	0.086	3302
Greece	-0.114 (0.070)	0.007 (0.022)	0.032 (0.027)	-0.035 (0.024)	0.065	3567
Ireland	0.049 (0.071)	-0.000 (0.031)	0.015 (0.048)	0.080* (0.038)	0.182	2511
Italy	0.038 (0.026)	-0.004 (0.011)	-0.024 (0.015)	-0.009 (0.013)	0.041	6583
Portugal	-0.040 (0.034)	0.010 (0.016)	-0.014 (0.018)	0.010 (0.017)	0.176	6038
Spain	-0.005 (0.051)	0.012 (0.017)	0.025 (0.023)	-0.029 (0.018)	0.111	7058

Women						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (within)	Observations
Austria	-0.048* (0.022)	0.028 (0.034)	-0.021 (0.026)	-0.007 (0.029)	0.120	2531
Belgium	0.035 (0.044)	0.025 (0.062)	-0.011 (0.049)	-0.142* (0.056)	0.144	1386
Denmark	-0.056 (0.032)	-0.004 (0.028)	0.059 (0.032)	-0.009 (0.027)	0.067	2250
Finland	-0.000 (0.024)	0.018 (0.027)	-0.008 (0.023)	-0.041 (0.028)	0.056	2873
Greece	0.016 (0.034)	-0.007 (0.044)	0.011 (0.030)	0.030 (0.042)	0.074	2516
Ireland	-0.063 (0.045)	0.052 (0.051)	0.045 (0.042)	-0.039 (0.052)	0.312	1997
Italy	0.020 (0.013)	0.036 (0.022)	-0.024 (0.018)	-0.012 (0.017)	0.064	4343
Portugal	-0.025 (0.021)	-0.005 (0.022)	0.029 (0.017)	0.009 (0.021)	0.126	4296
Spain	-0.008 (0.026)	-0.067 (0.035)	-0.014 (0.029)	0.075* (0.033)	0.140	4176

Robust standard errors in parentheses. The dependent variable is the logarithm of hourly wages. MedLighter indicates a BMI < 20 and MedHeavier a BMI > 26. NormLighter indicates a BMI more than three index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI more than three index points higher than the respective peer group body mass. Each line represents a separate regression. See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

Table A6: Wage effects for deviations of more than one standard deviation from peer group mean BMI

Men				
	NormLighter	NormHeavier)	R^2 (between)	Observations
Austria	-0.010 (0.029)	-0.036 (0.019)	0.342	3823
Belgium	-0.034 (0.033)	-0.048* (0.021)	0.415	1530
Denmark	-0.044 (0.031)	-0.041* (0.021)	0.372	2585
Finland	-0.056* (0.028)	-0.010 (0.023)	0.439	3302
Greece	-0.080* (0.038)	-0.072*** (0.018)	0.532	3567
Ireland	-0.061 (0.053)	-0.012 (0.026)	0.484	2511
Italy	-0.046* (0.019)	0.006 (0.014)	0.459	6583
Portugal	-0.026 (0.026)	0.007 (0.017)	0.492	6038
Spain	-0.006 (0.030)	-0.042*** (0.013)	0.523	7058

Women				
	NormLighter	NormHeavier	R^2 (between)	Observations
Austria	-0.028 (0.022)	0.010 (0.019)	0.250	2531
Belgium	-0.035 (0.035)	-0.010 (0.023)	0.422	1386
Denmark	0.026 (0.027)	0.002 (0.017)	0.494	2250
Finland	0.009 (0.027)	-0.029 (0.022)	0.470	2873
Greece	-0.033 (0.042)	-0.008 (0.020)	0.646	2516
Ireland	0.001 (0.047)	0.003 (0.022)	0.656	1997
Italy	-0.040 (0.024)	-0.022 (0.018)	0.516	4343
Portugal	0.033 (0.032)	0.006 (0.020)	0.683	4296
Spain	0.056 (0.036)	-0.041* (0.016)	0.635	4176

Estimates of a between-effects model. Robust standard errors in parentheses. The dependent variable is the logarithm of hourly wages. NormLighter indicates a BMI more than one standard deviation below the age and gender specific mean BMI within a region and NormHeavier indicates a BMI more than one standard deviation higher than the respective mean of the peer group body mass. Each line represents a separate regression See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

Table A7: Estimates of wage effects for deviations of more than 1.5 index points from medically recommended and peer group median BMI in Europe

Men						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (between)	Observations
Austria	-0.062 (0.039)	0.073* (0.034)	0.099** (0.037)	-0.034 (0.026)	0.344	3,823
Belgium	-0.046 (0.040)	-0.025 (0.039)	-0.027 (0.040)	-0.034 (0.032)	0.418	1,532
Denmark	-0.006 (0.042)	0.040 (0.039)	-0.031 (0.042)	-0.092** (0.030)	0.378	2,576
Finland	-0.115** (0.039)	0.011 (0.036)	0.013 (0.038)	-0.036 (0.027)	0.443	3,302
Greece	-0.222*** (0.059)	0.081 (0.046)	0.059 (0.051)	-0.096*** (0.024)	0.537	3,567
Ireland	-0.270*** (0.074)	0.071 (0.059)	0.164* (0.064)	-0.015 (0.037)	0.491	2,511
Italy	-0.068** (0.025)	0.017 (0.021)	0.019 (0.022)	0.006 (0.019)	0.460	6,583
Portugal	-0.002 (0.037)	0.051 (0.032)	0.026 (0.035)	-0.011 (0.023)	0.492	6,038
Spain	-0.058 (0.041)	0.026 (0.034)	0.027 (0.037)	-0.062** (0.021)	0.524	7,058

Women						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (between)	Observations
Austria	-0.020 (0.044)	-0.017 (0.053)	0.050 (0.041)	0.042 (0.059)	0.349	2,531
Belgium	0.059 (0.035)	0.009 (0.043)	-0.101** (0.036)	-0.012 (0.045)	0.427	1,386
Denmark	0.018 (0.055)	0.018 (0.060)	0.021 (0.055)	-0.022 (0.062)	0.497	2,250
Finland	0.012 (0.038)	-0.068 (0.044)	0.012 (0.037)	0.037 (0.044)	0.473	2,873
Greece	-0.120** (0.044)	-0.063 (0.052)	0.061 (0.044)	0.029 (0.054)	0.649	2,516
Ireland	-0.058 (0.065)	-0.003 (0.070)	0.070 (0.063)	-0.019 (0.069)	0.658	1,997
Italy	-0.006 (0.025)	-0.046 (0.028)	-0.046* (0.023)	0.010 (0.031)	0.518	4,343
Portugal	0.030 (0.034)	-0.050 (0.041)	-0.011 (0.036)	0.055 (0.039)	0.683	4,296
Spain	-0.000 (0.039)	-0.021 (0.045)	0.019 (0.038)	-0.025 (0.051)	0.635	4,176

Estimates of a between-effects model. Robust standard errors are in parentheses. The dependent variable is the logarithm of hourly wages. MedLighter indicates a BMI < 21.5 and MedHeavier a BMI > 24.5. NormLighter indicates a BMI more than 1.5 index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI more than 1.5 index points higher than the respective peer group body mass. Each line represents a separate regression. See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.

Table A8: Estimates of wage effects for deviations of more than five index points from medically recommended and peer group median BMI in Europe

Men						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (between)	Observations
Austria	-0.170 (0.146)	-0.062 (0.041)	0.139 (0.085)	0.022 (0.044)	0.345	3,823
Belgium	0.259 (0.170)	-0.074 (0.050)	-0.209* (0.085)	0.036 (0.051)	0.420	1,532
Denmark	0.082 (0.267)	0.032 (0.048)	-0.128 (0.091)	-0.069 (0.050)	0.374	2,576
Finland	-0.365 (0.228)	0.049 (0.035)	-0.119 (0.082)	-0.064 (0.042)	0.442	3,302
Greece	0.055 (0.432)	0.039 (0.039)	-0.351** (0.120)	-0.107** (0.038)	0.536	3,567
Ireland	0.204 (0.382)	0.012 (0.061)	-0.186 (0.107)	-0.014 (0.059)	0.485	2,511
Italy	0.050 (0.121)	-0.002 (0.029)	-0.040 (0.064)	0.014 (0.032)	0.458	6,583
Portugal	-0.003 (0.221)	0.039 (0.034)	0.012 (0.074)	-0.039 (0.036)	0.492	6,038
Spain	0.265 (0.195)	-0.032 (0.033)	-0.057 (0.069)	-0.014 (0.031)	0.524	7,058

Women						
	MedLighter	MedHeavier	NormLighter	NormHeavier	R^2 (between)	Observations
Austria	-0.013 (0.100)	-0.075 (0.099)	0.109 (0.133)	0.101 (0.096)	0.350	2,531
Belgium	-0.041 (0.073)	-0.063 (0.065)	0.170 (0.141)	0.053 (0.064)	0.423	1,386
Denmark	0.130 (0.150)	0.175 (0.104)	-0.276 (0.172)	-0.174 (0.104)	0.497	2,250
Finland	-0.108 (0.091)	-0.089 (0.064)	0.046 (0.082)	0.047 (0.065)	0.472	2,873
Greece	-0.022 (0.091)	0.033 (0.086)	-0.059 (0.117)	-0.035 (0.087)	0.646	2,516
Ireland	0.067 (0.225)	-0.020 (0.096)	-0.089 (0.205)	0.022 (0.097)	0.657	1,997
Italy	-0.028 (0.039)	-0.037 (0.050)	0.006 (0.103)	0.015 (0.045)	0.515	4,343
Portugal	-0.000 (0.098)	0.075 (0.066)	0.086 (0.079)	-0.083 (0.067)	0.683	4,296
Spain	-0.089 (0.083)	0.016 (0.105)	0.287 (0.154)	-0.065 (0.106)	0.635	4,176

Estimates of a between-effects model. Robust standard errors are in parentheses. The dependent variable is the logarithm of hourly wages. MedLighter indicates a BMI < 18 and MedHeavier a BMI > 28. NormLighter indicates a BMI more than five index points below the age and gender specific median BMI within a region and NormHeavier indicates a BMI more than five index points higher than the respective peer group body mass. Each line represents a separate regression. See text for information on included control variables. Significance at the 5 %, 1 % and 0.1 % level is denoted by *, ** and ***, respectively.