Obesity, Employment and Wages in Europe*

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Abstract. This paper examines the associations between obesity, employment status and wages for several European countries. Our results provide weak evidence that obese workers are more likely to be unemployed or tend to be more segregated in self-employment jobs than their non-obese counterparts. We also find difficult to detect statistically significant relationships between obesity and wages. As previously reported in the literature, the association between obesity, unemployment and wages seems to be different for men and women. Moreover, heterogeneity is also found across countries. Such heterogeneity can be somewhat explained by some labor market institutions, such as the collective bargaining coverage and the employer-provided health insurance.

JEL Classification: J3, I1.

Key words: obesity, labor market, heterogeneity, institutions.

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1. Introduction

That obesity is one of the most important public health concerns is a well-known fact: obesity is a risk factor for numerous health problems and many chronic diseases (WHO, 2002), and its prevalence has increased by 10-40% in most European countries over the last decade (WHO, 2003) [1]. Moreover, obesity affects not only adults but also teenagers and children, specially, in southern Europe (IOTF, 2002, 2003). For all these reasons, it is important to assess both the determinants and the consequences of obesity (Philipson, 2001).

The effects of obesity on labor market outcomes for the US have been assessed in a large number of studies[2]. One of their most robust findings is that obese women tend to earn less than their non-obese counterparts and that there are differences by ethnicity and/or race (Cawley, 2005). However, the available empirical evidence for Europe is more limited. On the one hand, there are some studies for particular European countries: UK (Sargent and Blanchflower, 1994; Morris 2005, 2006), Finland (Sarlio-Lahteenkorva and Lahelma, 1999), Germany (Cawley, Grabka, and Lillard, 2005), and Denmark (Greve, 2005). In the work by Sargent and Blanchflower (1994), hourly earnings of women at age 23 are found to be lower conditioned on being obese at age 16, but no such a relation is found for men. More recently, Morris (2005, 2006) shows that body mass index (BMI) has a positive and significant effect on mean hourly occupational earning in males and a negative and significant effect in females, although the association for males is not robust across different specifications. However, after using the mean BMI (and/or the prevalence of obesity) across individuals living in the same health authority area as an instrument for individual BMI, he

[1] According to the WHO, an obese individual is defined as having a body mass index (BMI) of 30 or above. BMI is equal to weight in kilograms divided by height in meters squared.

[2] See, for example, Register and Williams (1980), Hamermesh and Biddle (1994), Averett and Korenman (1996), Pagán and Dávila (1997), Cawley (2000, 2004), Behrman and Rosenzweig (2001), Saporta and Halpern (2002), Baum and Ford (2004), and Conley and Glauber (2005, 2006).

finds no statistically significant effect, either for men or for women. In Finland, obese female are found to have lower income levels than non-obese ones, but that it is not the case for males (Sarlio-Lahteenkorva and Lahelma, 1999). The empirical evidence for Germany shows that obesity is negatively associated with wages, both for men and for women (Cawley, Grabka, and Lillard, 2005). Moreover, using genetics as a natural experiment, the authors cannot reject the hypothesis of no causal impact of weight on wages. Finally, preliminary evidence for Denmark shows a negative effect of obesity and overweight on employment for women, while for men overweight seems to have a positive effect on employment (Greve, 2005)[3].

On the other hand, there are some studies for Europe as a whole, using the European Community Household Panel (ECHP), the dataset used in the present article. D'Hombres and Brunello (2005) analyze the effect of BMI on wages in Europe. Pooling all countries together, they find that the association between BMI and wages is negative for women, and positive for men. Using BMI from biological family members as an instrument for individual BMI, they report a negative effect of BMI for both men and women. However, as these authors recognize, assuming a common relationship between obesity and wages across different European countries is too restrictive, given the different characteristics in labor markets across such countries. They distinguish between two groups of countries: "olive belt" (Greece, Italy, Portugal and Spain), and "beer belt" (Austria, Belgium, Denmark, Finland and Ireland). According to their IV estimates, the sign of the relationship between BMI and wages depends on the group of countries: BMI has a positive effect on wages for both men and women in the "beer-belt" countries, while this effect is negative in the "olive-belt" countries. They argue that one plausible explanation for such a finding is the interaction between BMI and weather: the "olive-belt" countries have warmer weather, while those belonging to the "beer belt" have colder weather. From a human capital point of view,

[3] These effects are estimated using whether or not the individual's parents have ever taken medication related to obesity (or obesity related diseases) and their mortality status as instruments for individual BMI.

investment in body size can be seen as a way of enhancing productivity in colder places. This argument might be reasonable in a rural-farm economy, but we do not consider it is appropriate in the case of developed European countries. Moreover, the fact that different BMI-wage relationships are found for each of these two groups is a strong reason to allow each relationship to be different across countries.

Sousa (2005) applies the propensity score technique (matching estimator) in order to assess the causal effect of BMI on labor market outcomes in Europe using the ECHP. Pooling all countries together, she finds the average treatment effect for those having a BMI above 25 decreases labor force participation for women, but it increases male labor force participation. Moreover, when she allows for different average treatment effects in Northern and Southern countries, her qualitative results are the same. However, the average treatment effect is not estimated for each country separately.

Finally, there is a recent study by Lundborg et al. (2006) using the Survey of Health, Ageing and Retirement in Europe (SHARE), where the authors analyze the effect of obesity on employment, hours worked and hourly wages in 10 European countries for people aged 50 and above. Pooling all countries, they find that obesity is negatively associated with being employed for both men and women and with female hourly wages. Moreover, their results by country-group (Nordic, Central and Southern) suggest that the effects of obesity on labor market outcomes differ across Europe.

Unfortunately, none of these studies provide a fully comparable country-by-country European analysis, which seems necessary according to the empirical evidence in d'Hombres and Brunello (2005) and Lundborg et al. (2006). Thus, the main purpose of the present work is to provide empirical estimates of the associations between body size variables and labor market outcomes in a large number of European countries, without restricting all associations to be equal across countries or groups of countries. As far as we know, none of the existent studies has analyzed the correlations between body size and the labor market status: employee, self-employment and unemployed. Additionally, we go one step further providing some evidence on the potential role played by labor market institutions and cultural factors in explaining these associations. It is important to mention that we do not aim to provide a causal analysis, but we are interested in offering just a description, as accurate as possible, of the relationship between body size and labor market outcomes.

The paper is organized as follows. Section 2 describes the issues of correlation and causality when interested in the relation between body size and labor market outcomes. In Section 3, we present the dataset, the variables used and our main results. Section 4 includes a first exploration of the role played by different cultural and labor market institutions on the association between obesity and labor market outcomes. Finally, Section 5 concludes with suggested possible avenues for further research.

2. Body Size and Labor Market Outcomes: Correlation and Causality

As mentioned in the previous section, the purpose of this paper is not to identify the causal effect of body size on labor market outcomes, since this is a challenging task without a credible quasi-experiment or experimental data. Rather we aim to provide a descriptive analysis. As emphasized by Cawley (2005), the associations between body size and labor market outcomes can reflect three possible relations: the effect of obesity on labor market outcomes (discrimination and/or productivity), the effect of labor market outcomes on obesity (see Morland et al., 2002), and the effect of a third factor on both obesity and labor market outcomes (for example, individual time preference).

In order to disentangle causality from correlation in the relationship between body size and labor market outcomes, several empirical strategies have been used: lagged measures of the BMI (see for example, Conley and Glauber, 2005, 2006), fixed-effects strategies (for example, individual differences like in Averett and Korenman, 1996, or using monozygotic twins, see Behrman and Rosenzweig, 2001), instrumental variables (for example, genetic variation, like in Cawley 2000, 2004, or in d'Hombres and Brunello, 2005; obesity medication taken by parents or their mortality status, in Greve, 2005; average BMI (and prevalence of obesity) across individuals living in the same health authority area, in Morris, 2005, 2006; the presence of other obese persons in the household, being an oldest child, and having sisters only, in Lundborg et al. 2006), and propensity score (Sousa, 2005). However, all these identification strategies are somewhat disappointing, since the assumptions they rely on are very strong.

First, in the lagged specification strategy, the independence of the lagged BMI variable on the residual term is required, which is very unlikely to be true, because the error term is likely to capture some omitted variable related to both past BMI and the contemporaneous labor market outcome of interest (for example, through self-esteem).

Second, fixed-effects strategies require the regressors to be strictly exogenous and that all the omitted relevant and unobserved individual characteristics remain constant over time. On the one hand, BMI's strict exogeneity is defined as BMI being uncorrelated with the error term for all leads and lags, which is highly implausible when using individual fixed-effects, since the lagged BMI measure might be correlated with the contemporaneous error term (see the explanation above in the lagged strategy case). On the other hand, the individual fixed-effects strategy involves a particular implicit trade-off between precision and consistency. The shorter the time period, the lower the probability that unobserved individual differences arise over time, which is favorable to the assumption of fixed differences across individuals. However, the shorter the period of time, the higher the imprecision of the estimated effect. In the limit, there is no change at all, and such estimation is not possible. On the contrary, the longer the time period, the higher the precision of our estimates, but then it is also unlikely that an individual fixed effect is capturing all the relevant omitted variables. Hence, our estimates are likely to be inconsistent. Moreover, there is no a priori argument why we should prefer imprecision to inconsistency (Deaton, 1997), as it can be easily seen from the previous extreme case. Even in the hypothetical case that these assumptions were satisfied, reverse causality could not be discarded, which is likely to be an issue in this context (Morland et al., 2002).

Third, when using instrumental variables techniques, the usual relevance and exogeneity conditions are required (Wooldridge, 2001). In Cawley (2000), the weight of a child is used as an instrument for the weight of the child's mother. At first glance one may think this constitutes a valid instrument, a source of exogenous variation in weight due to genetics. However, if for instance the genetic component of the child associated with weight is also related to other factors regarding employment and wage of the mother, this kind of instrument does not satisfy the exogeneity condition. Recently, Cawley (2004) has used sibling weight adjusted for sex and age to instrument individual weight, justifying again the exogeneity of such instrument on the grounds of genetic variation. The problem is that, as recognized by Cawley (2004, 2005), there exists the possibility that a substantial part of the genes responsible for obesity are also responsible for other factors that affect labor market outcomes, such as willingness to delay gratification (time discount rate) or other kind of unobserved characteristic. Since the current knowledge on which particular genes are responsible for obesity and other factors related with wages and employment is too scarce, we doubt the validity of these instruments[4].

It might be the case that for this reason, Sousa (2005) decides to use a propensity score approach. Using the propensity score, she creates similar groups of people based on observable characteristics, and it provides consistent estimates under the assumption that those groups, which are constructed to be similar in observable characteristics, are also similar in their unobservable characteristics. However this method requires a large number of observations to be able to construct enough groups of individuals based on their observable characteristics, and the required sample size will be higher, the higher the number of covariates used in the construction of such groups. Indeed, Sousa (2005) faces a problem of small sample size because of the relative low number of observations in the ECHP compared to other micro databases. This forces her to pool all the countries together (or at most to estimate the effect of body size for only 2 groups of countries: a subsample of Northern and a subsample of Southern countries), restricting the estimated average

[4] We also doubt the validity of the instruments for BMI that have been suggested recently. Morris (2005, 2006) uses mean BMI (and/or prevalence of obesity) across individuals living in the same health authority area. His identification strategy is flawed because of the potential existence of non-random sorting in health authorities where individuals live (depending on unobservable factors related to obesity and occupational attainment). Greve (2005) uses whether or not the individual's parents have ever taken medication related to obesity (or obesity related diseases) and their mortality status. It is difficult to believe that such instruments are not related to unobservable factors affecting both BMI and labor market outcomes, such as children depression in the case of the later, or parental investments in the former. Lundborg et al. (2006) recognize some of the problems of the instruments they use in their paper.

treatment effect on the treated (those with a BMI above 25) to be the same in each country (or in each group of countries). The problem of estimating an average treatment effect on the treated (ATT) for Europe as a whole (or only for Southern and Northern European countries) is twofold. First, if the ATT differs across countries, the estimated ATT cannot be informative for a particular country. Second, even if we are interested in an average ATT for Europe as a whole, we should properly weigh each country's specific ATT.

In this paper we focus on two main labor market outcomes: employment status in the labor market and hourly wage[5]. First, we are concerned with the relationship between body size and labor market status, because it is likely to provide direct and understandable signs on the existence of discrimination in the labor market. For this reason, instead of estimating the probability of being employed versus being unemployed, we propose a multinomial logit with the following outcomes: employee, self-employed and unemployed. There are two justifications for such an approach. First, this specification is logical from a timing point of view: these outcomes are observable conditioned on participating in the labor force, a condition clearly violated by a specification of the employed-versus-unemployed/inactive type. Second, and more important, this econometric model sheds more light on the existence of discrimination. Under physical discrimination in the hiring process, we should expect to find not only that unemployed people are more obese than those who are employed, but also that self-employed tend to be more obese than employed. Secondly, we are interested in the relationship between body size and wages. If, after controlling for observable characteristics determining wages, we find wage differentials between obese and non-obese workers, this will be a sign of the potential existence of discrimination in the labor market, although obviously not conclusive, in the sense that we are not dealing with BMI's endogeneity.

[5] We do not present associations between obesity and labor force participation because of the strong reverse causality. These results are available from the authors upon request.

3. Empirical Analysis

3.1. Data Set

The data used in this paper come from the European Community Household Panel (ECHP), Eurostat, a survey based on a standardized questionnaire that involves annual interviewing of a representative panel of households and individuals in Member States of the European Union during the period 1994-2001. The ECHP annually interviews of a representative panel of households and individuals in each country, covering a wide range of topics on living conditions. The ECHP's standardized methodology and procedures yield comparable information across countries.

We only use the ECHP waves since 1998 (fifth wave), because this was the first time in which anthropometric data were collected. Moreover, in our analysis we only include countries with a full ECHP data format and those in which anthropometric data were collected: Austria, Belgium, Denmark, Finland (starting in 1999), Greece, Ireland, Italy, Portugal, and Spain[6].

We focus on two main labor market outcomes: the employment status in the labor market and the hourly wage. The employment status is defined as a categorical variable with possible states reported by the individual: (1) working more than 15 hours per week for an employer in a paid employment, paid apprenticeship or under other related schemes; (2) working more than 15 hours in self-employment or in a family enterprise (unpaid work); (3) unemployed. Individuals working less than 15 hours represented a 0.5% of the sample and were dropped from the analysis. The wage variable is defined as the natural logarithm of the hourly wage. The hourly wage is constructed by dividing the variable "net monthly wage and salary earnings" by the number of

[6] For more detailed information on the ECHP, visit EuroPanel Users Network at http://epunet.essex.ac.uk/index.php

monthly hours (including paid overtime) worked in the main job, which are computed approximately as four times the number of hours (including paid overtime) worked in the main job.

We estimate different models for each country, allowing for a pure flexible econometric specification, in the sense that none of the coefficients are restricted to be the same across countries. Moreover, the models are estimated for men and women separately.

To estimate the associations between labor market status and body size, a multinomial logit model is specified. The associations between wages and the alternative body size measures are estimated through standard ordinary least squares.

Three different measures of body size are used in this paper: 1) body mass index (BMI is defined as weight in kilograms divided by height in meters squared); 2) weight in kilograms (controlling for height in centimeters); and 3) an indicator for being obese (controlling for the rest of BMI categories)[7]. All these variables are constructed using self-reported height and weight measures. An important point is that we are going to focus on the specification containing BMI categories, and we will devote our attention to the obesity indicator. This decision is based on two main advantages of such an approach. First, given that a non-monotonic relationship between body size and labor market outcomes cannot be discarded on a priori grounds (see the empirical evidence in Saporta and Halpern, 2002), the BMI dummies approach offers a flexible and straightforward procedure for addressing this issue. Second, since the main purpose of the paper is to estimate the association between obesity and labor market outcomes, this body size variable is the one we are more interested in.

Apart from the body size variable, both the participation and labor market status equations include the following covariates: age, age squared, two dummies indicating the highest completed education level, household income once individual earnings are discounted (which is adjusted to

[7] The standard BMI classification is the following: below 18.5 is underweight, between 18.5 and 25 is healthy (normal), between 25 and 30 is overweight and 30 and above is obese.

equivalent units using the OECD conversion scale and standardized at the country level), country dummies, year dummies, and the interactions between country and year dummies. To take account of the relationship between children, female labor supply, and pregnancy related weight gains, the employment equation includes one dummy for being married, the number of children below 14 in the household, and the number of children between 14 and 15 in the household. Nevertheless, these controls have been added to the male equations as well for comparability purposes.

We estimate standard wage equations which include: age, age squared, two dummies indicating the highest completed education level, experience (defined as the corresponding ECHP wave minus the age at which the individual had her first job), experience squared, and tenure (number of years in the current job), country effects, year effects and interactions between year and country effects.

Finally, we decided to control for interview effects, adding an indicator whether the year of the interview differs from the one regarding the information being asked, quarter of interview dummies, and an indicator whether the mode of interviewing was face-to-face. All these interview controls are assumed to have common effects across countries.

The sample is restricted to people between 25 and 54, the demographic group with the highest employment rate. The appendix contains the tables with the basic descriptive statistics for each country.

ECHP personal weights are used in all estimations described in this paper. The standard error for each reported coefficient is robust to heteroskedasticity and calculated with clustering by individual to account for correlations in the error terms of each individual over time.

3.2. Estimated Associations

In this subsection we present the empirical results. In Tables 1A and 1B we report the estimated associations between employment status and obesity obtained from the estimation of the multinomial logit model. For the three body size measures, the reported associations are presented in terms of Relative Risk Ratios (RRRs) between the probability of working as a self-employed (Table 1A) and the probability of being unemployed (Table 1B) both with respect to the probability of working as an employee.

As we can see in Table 1A, in 7 out of 9 countries, the RRRs for women are higher than one, which means that obese women tend to be more self-employed rather than working as employees. However, only in 3 out of 9 cases are the RRRs statistically significant, ranging from approximately 1.6 in both countries Greece and Italy to 2.1 in Ireland. Roughly speaking, obese Greek and Italian women have a 50% higher probability of working as self-employed workers rather than as employees, while in Ireland, obese women tend to be two times more concentrated in self-employment rather than working as employees. For men, similar results arise, finding statistically significant RRRs higher than 1 in Greece (1.6), Ireland (1.8) and Spain (1.4).

Some caution must be taken when interpreting these results. On the one hand, we find 6 out of 18 coefficients (counting both men and women) to be statistically significant, which means 1/3 of the estimated coefficients appear to be statistically significant. Furthermore, taking into account that we are looking at the effects of obesity on labor market status across several countries, the probability of rejecting non-significance of a particular coefficient when in fact this coefficient is not significant is very high. This means that even by chance we may find statistically significant associations. In order to address this issue, p-values are adjusted using Bonferroni's method for multiple testing[8]. On the other hand, the relationship between body size and labor market status, although it may capture the effect of discrimination against obese people in the hiring process, more importantly it is likely to reflect reverse causality from labor market status (employee, self-employed, or unemployed) to obesity, or some type of selection or sorting in employment versus self-employment. If we are willing to assume that an important channel through which reverse causality and selection occur is through health problems, a crude way to address these concerns is using a sample readjustment. The idea is to exclude people who declare being hampered by any kind of physical or mental disability affecting their daily life activities and trimming some observations falling outside the [15, 45] BMI interval (88 and 55 for women and men respectively). After performing this crude sample readjustment, we find that obesity is statistically significantly associated with a higher relative probability of being self-employed with respect to being an employee in 4 and 2 out of 9 cases for women and men respectively. However, once we compute the Bonferroni's adjusted p-values for the new sample, we find no statistically significant associations for women, and only one significant association is found for men: in Greece, obese men are found to be 70% more likely to be self-employed rather than being employees with respect to non-obese.

Overall, there is weak evidence that obese workers tend to be more segregated in self-employment than the non-obese ones. According to our results, there is no evidence on discrimination against obese in terms of being relatively more likely to be self-employed workers rather than employees, neither for men nor for women.

[8] The idea behind the Bonferroni's adjustment is to minimize the probability of making a Type-I error. Although it is a conservative procedure, it is use is justified on two key grounds: 1) we have no a priori well-defined hypothesis on how these associations should differ across countries; and 2) we are searching for associations without pre-established hypotheses.

Table 1A Labor Market Status Equations
Multinomial Logit: Relative Risk Ratios for Body Size Measures
Dependent variable: [Prob. of Self-Employed / Prob. of Employee]

	Female			Male		
	(1)	(2)	(3)	(1)	(2)	(3)
	BMI	Weight♣	Obese♣♣	BMI	Weight♣	Obese♣♣
Austria	1.038	1.014	1.005	1.027	1.009	1.249
	(.026)	(.009)	(.362)	(.027)	(.008)	(.360)
Belgium	.983	.996	.876	.978	.995	.817
	(.031)	(.011)	(.407)	(.024)	(.008)	(.250)
Denmark	1.021	1.007	1.428	.979	.997	.608
	(.051)	(.018)	(.856)	(.032)	(.009)	(.252)
Finland	1.018	1.007	1.012	1.006	1.001	.912
	(.021)	(.008)	(.343)	(.021)	(.006)	(.226)
Greece	1.045***	1.017***	1.589**	1.034***	1.011***	1.629***
	(.016)	(.006)	(.362)	(.014)	(.005)	(.251)
Ireland	1.054*	1.025**	2.076*	1.069***	1.023***	1.784**
	(.032)	(.012)	(.906)	(.024)	(.007)	(.445)
Italy	1.023	1.010	1.587*	1.019	1.008*	1.188
	(.017)	(.007)	(.414)	(.012)	(.004)	(.178)
Portugal	.981	.994	.979	1.045*	1.017*	1.584
	(.023)	(.009)	(.289)	(.025)	(.009)	(.450)
Spain	1.029	1.013*	1.291	1.029**	1.010**	1.383**
	(.019)	(.007)	(.306)	(.013)	(.005)	(.225)
Pseudo-R^2	.12	.12	.12	.09	.09	.09
N	48,743	48,743	48,743	66,884	66,884	66,884

Note: All regressions include age, age squared, two educational dummies, standardized rest of household income in equivalent units, a dummy of married, the number of children under 14 in the household, the number of children between 14 and 15 in the household, country dummies, annual dummies, interaction between country and annual dummies, quarter of interview dummies, an indicator if the year of the interview differs from the panel wave and an indicator for face-to-face interview.
Standard errors robust to heteroskedasticity (clustered at the individual level) are in parentheses. Observations have been weighted using the ECHP personal weights.
♣ Height is also included. ♣♣ Underweight and overweight categories are also included.
* Significant at the 10 % level. ** Significant at the 5 % level. *** Significant at the 1 % level.

When analyzing the ratio between the probability of being unemployed with respect to the probability of working as an employee, Table 1B seems to suggest very different results for women and men: obesity seems to be associated with a higher relative probability of being unemployed in all countries but Denmark for the former, while for the later, in 6 out of 9 countries, we find the opposite result: obesity is associated with a lower relative probability of being unemployed. However, statistical significant associations are found in only 4 countries: Belgium, 2.2 for women, 3.1 for men; Finland, .5 for men; Italy, 1.7 for women; and Spain, 1.9 for women.

Applying the same logic as in the analysis of Table 1A, once we exclude hampered people and potential outliers, statistically significant associations remain in Belgium (2.2 for women, 3.3 for men), and in Spain (1.7 for women). Moreover, the relationship in Belgium is robust to adjusted p-values for both men and women: obese women in Belgium are more than twice likely to be unemployed rather than working as employees, and for men this ratio is even higher, more than three times. As in the previous analysis, if anything, there is weak evidence that obese workers are more likely to be unemployed rather than their non-obese counterparts.

Table 1B Labor Market Status Equations
Multinomial Logit: Relative Risk Ratios for Body Size Measures
Dependent variable: [Pr. of Unemployed/Pr. of Employee]

	Female			Male		
	(1)	(2)	(3)	(1)	(2)	(3)
	BMI	Weight♣	Obese♣♣	BMI	Weight♣	Obese♣♣
Austria	1.068*	1.021	1.416	.992	.998	1.159
	(.038)	(.013)	(.650)	(.040)	(.013)	(.407)
Belgium	1.029	1.010	2.150***	1.077**	1.025***	3.051***
	(.022)	(.008)	(.601)	(.033)	(.010)	(.947)
Denmark	.993	.997	.928	1.008	1.001	2.011
	(.029)	(.010)	(.331)	(.056)	(.016)	(1.185)
Finland	1.031	1.012	1.283	.945*	.983*	.503*
	(.022)	(.008)	(.354)	(.031)	(.010)	(.195)
Greece	1.041*	1.015*	1.336	.966	.981*	.959
	(.024)	(.009)	(.390)	(.033)	(.0100)	(.269)
Ireland	.992	.997	1.497	.921**	.971**	.609
	(.052)	(.020)	(.779)	(.032)	(.012)	(.211)
Italy	1.055***	1.021***	1.711*	.981	.994	.956
	(.017)	(.006)	(.508)	(.021)	(.008)	(.272)
Portugal	.995	1.000	1.242	.920*	.974	.582
	(.035)	(.014)	(.503)	(.043)	(.016)	(.256)
Spain	1.034**	1.013**	1.914***	.957**	.985**	.922
	(.016)	(.006)	(.355)	(.018)	(.006)	(.192)
Pseudo-R^2	.12	.12	.12	.09	.09	.09
N	48,743	48,743	48,743	66,884	66,884	66,884

Note: All regressions include age, age squared, two educational dummies, standardized rest of household income in equivalent units, a dummy of married, the number of children under 14 in the household, the number of children between 14 and 15 in the household, country dummies, annual dummies, interaction between country and annual dummies, quarter of interview dummies, an indicator if the year of the interview differs from the panel wave and an indicator for face-to-face interview.
Standard errors robust to heteroskedasticity (clustered at the individual level) are in parentheses. Observations have been weighted using the ECHP personal weights.
♣ Height is also included. ♣♣ Underweight and overweight categories are also included.
* Significant at the 10 % level. ** Significant at the 5 % level. *** Significant at the 1 % level.

Finally, Table 2 presents the correlations between log of hourly wages and body size measures. For women, all such correlations are negative in all countries, except for Ireland for the weight measure. Something similar happens for men with the two continuous body size measures (BMI and weight), but the correlation goes in the opposite direction: all such correlations are positive. Nevertheless, once we focus on obesity, the results for men are mixed. However, emphasis must be put on statistically significant associations. In the case of obesity, these are found in Denmark, Finland and Portugal. On the one hand, obese Danish female workers tend to earn a 9% lower hourly wage than their non-obese counterparts. In Finland and Portugal the female obesity wage gaps are 10% and 7%. On the other hand, we only find a significant relationship in the case of men: obese Belgian employees tend to earn a higher hourly wage (8%) than their non-obese counterparts. It is worth noting that we detected that 16 observations (those falling outside of the [15, 45] BMI interval) from the initial sample of employees were responsible for the statistical negative association for women in Portugal. Given the potential sensibility of our estimates to outliers, we decided to trim the data outside the [15, 45] BMI interval, as we did previously in the labor market status equations. Moreover, we check the robustness of such associations estimating the following augmented specifications: (1) adding occupational dummies and firm size, (2) adding occupational dummies, firm size, and self-reported health status dummies, and (3) adding occupational dummies, firm size, self-reported health status dummies and excluding hampered people[9]. In two countries, we find robust statistically significant correlations for all 4 specifications. In the specification (3) obese Danish women employees are found to earn a 7% lower wage than their non-obese counterparts. In Belgium, obese men tend to earn higher wages than non-obese

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[9] There are 9 occupational categories: 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 trade workers; Plant and machine operators and assemblers; and Elementary occupations. Firm size is a variable taking value 0 if there is none regular paid employees in the local unit in the current job, 2.5 if 1-4, 12 if 5-19, 34.5 if 20-49, 74.5 if 50-99, 299.5 if 100-499 and 500 if 500 or more. Self-reported health status categories are very good, good, fair, bad and very bad.

ones. Nevertheless, none of these associations are statistically significant once the p-values are adjusted for multiple testing.

In summary, our results indicate it is difficult to detect statistically significant associations between wages and obesity, both for men and for women.

Table 2 Wage Equations
Ordinary Least Squares: Marginal Effects for Body Size Measures
Dependent variable: log(hourly wage)

	Female			Male		
	(1)	(2)	(3)	(1)	(2)	(3)
	BMI	Weight♣	Obese♣♣	BMI	Weight♣	Obese♣♣
Austria	-.006*	-.002*	-.023	.003	.001	.047
	(.003)	(.001)	(.042)	(.003)	(.001)	(.032)
Belgium	-.002	-.001	-.037	.005**	.002**	.084**
	(.003)	(.001)	(.043)	(.003)	(.001)	(.033)
Denmark	-.008***	-.003***	-.092***	.002	.001	-.011
	(.003)	(.001)	(.029)	(.003)	(.001)	(.031)
Finland	-.008**	-.002	-.099**	.001	.000	-.010
	(.004)	(.001)	(.043)	(.003)	(.001)	(.033)
Greece	-.004	-.002	-.084	.002	.001	.008
	(.004)	(.001)	(.055)	(.003)	(.001)	(.037)
Ireland	-.001	.000	-.025	.007	.003*	.069
	(.003)	(.001)	(.047)	(.004)	(.002)	(.062)
Italy	-.004	-.001	-.067	.000	.001	-.020
	(.003)	(.001)	(.050)	(.002)	(.001)	(.028)
Portugal	-.006**	-.002**	-.074*	.007	.003*	.042
	(.002)	(.001)	(.044)	(.005)	(.002)	(.049)
Spain	-.006*	-.002	-.054	.001	.001	-.022
	(.004)	(.002)	(.059)	(.003)	(.001)	(.032)
N	17,971	17,971	17,971	29,429	29,429	29,429

Note: All regressions include age, age squared, two educational dummies, experience, experience squared, tenure, country dummies, annual dummies, interaction between country and annual dummies, quarter of interview dummies, an indicator if the year of the interview differs from the panel wave and an indicator for face-to-face interview.
Standard errors robust to heteroskedasticity (clustered at the individual level) are in parenthesis. Observations have been weighted using the ECHP personal weights.
♣ Height is also included. ♣♣ Underweight and overweight categories are also included.
* Significant at the 10 % level. * * Significant at the 5 % level. * * * Significant at the 1 % level.

Comparing our results to those in d'Hombres and Brunello (2005), and bearing in mind that both their sample and estimation strategy differ from ours (they include people between 18 and 65 and they use IV), we do not find that BMI and wages are positively associated in beer-belt countries and negatively in olive-belt ones. Nevertheless, they do not report the OLS estimations when allowing for differences between olive-belt and beer-belt countries[10].

To finish this section, we would like to mention some caveats regarding our empirical analysis. First of all, the body size measures used in this study are self-reported, which means that they are potentially measured with error. In fact, there is evidence showing that this measurement error is not random, and the direction of the bias, and its extent, vary systematically with age and sex (Thomas and Frankenberg, 2000). However, on the one hand, their results also show there is little variation in the bias with age from ages 25 to 54, which might possibly also be true for European data. On the other hand, since we are estimating equations for men and women separately, the sex bias variation is not a concern. Second, special attention should be devoted to the estimated wage-body size correlations from the augmented specifications. On the one hand, when controlling for occupational dummies and firm size, we should realize that this is only a crude control for taking into account unobserved individual differences associated with jobs and wages. So it is necessary to keep in mind that we are incurring into a bias due to sample selection, provided that there exists non-random sorting into different occupations and/or small versus large firms. For example, it might be the case that obese workers were more likely to be hired by small firms and/or in specific occupations, and hence, once we control for these endogenous variables, we do not find an effect of body size on wage. On the other hand, health status is likely to be endogenous, and similar problems arise. Third, it should be noted that there are potential selection issues in both labor market status and wage equations. However, since standard selectivity

[10] We also estimated several models for both the two groups of countries separately and pooled, and we did not find their associations.

corrections techniques depend on specific functional form assumptions and the exogeneity of the variables of the selection equation, we think this approach would add noise to our descriptive analysis.

4. The role of cultural factors and labor market institutions

Cawley (2005) formulates an interesting research question on the relationship between obesity and wages: Is there a universal pattern across countries or does it vary with culture and labor market institutions? The empirical evidence in d'Hombres and Brunello (2005) and Lundborg et al. (2006), discussed before, suggests that culture and labor market institutions may be relevant for understanding the associations between obesity and wages. In this section, we take a first look at the role played by different cultural and labor market factors on the associations between obesity and labor market outcomes. Nevertheless, we should be aware of the exploratory character of such analysis, since we have only nine data points, and hence any possible explanation based on such evidence has, at most, a tentative character.

On the labor market institutions side, existing empirical evidence shows that unions reduce wage inequality and that this compression effect is strongest in countries where union membership and bargaining coverage are high, and bargaining is centralized and/or coordinated (Blau and Kahn, 1999). There is also some evidence that the degree of collective bargaining coverage is positively associated with the relative wage of youths, older workers and women (OECD, 2004). This may also be the case for obese workers. For this reason, we focus on the collective bargaining coverage rate (the number of employees covered by a collective agreement over the total number of employees)[11]. Our working hypothesis is that the collective bargaining coverage rated, which seems to have a positive effect on the relative wages of youths, older and women, tends to reduce also the obesity wage "penalty". However, if firms are constrained in their abilities to adjust wages due to collective bargaining coverage, then an undesired effect might emerge through an increase of the obesity "penalties" in the hiring process. Hence, we might expect to find two effects from

[11] The collective bargaining coverage data come from Employment Outlook OECD (1997), chapter 3. The collective bargaining coverage rates used in the subsequent empirical analysis refer to 1994, except in Finland (1995), Italy (1993) and Portugal (1993).

higher collective bargaining coverage: 1) a lower obesity wage penalty; and/or 2) a lower probability of being hired (or more exactly, a higher relative probability of being unemployed with respect to being an employee) for obese workers.

Another labor market institution which might be relevant for the association between obesity and labor market outcomes is the percentage of employees receiving health care or medical insurance paid or subsidized by the employer[12]. Bhattacharya and Kate Bundorf (2005) find evidence that obese workers earn lower wages than non-obese worker because the cost to employers of providing health insurance for these workers is higher. However, there might be also a negative effect in the hiring process of obese workers. If employers are limited in their ability to pay lower wages to obese workers, because of the existence of collective agreements, then we might expect to find that firms tend to hire less obese workers. Thus, once again, we might expect to find two effects from higher employer provided health care (or medical insurance) rates: 1) a higher obesity wage penalty; and/or 2) a lower probability of being hired (or more exactly, a higher relative probability of being unemployed with respect to being an employee) for obese workers.

On the cultural factors side, we would like to present some evidence on the relationship between stronger cultural norms for thin body types and discrimination against obese people, in terms of both, hiring and payment in the labor market. Measuring cultural factors in a quantitative fashion is always a challenging task. However, we propose the use of two proxies for cultural norms regarding the acceptability of obesity: prevalence of obesity and the degree of social interactions.

On the one hand, under the assumption that cultural norms for thin body types are inversely related to the obesity prevalence in a society, its prevalence can be thought of as being a crude indicator for the social degree of acceptance of obesity in that country. Our working

[12] We compute the rate of health insurance provided by employers to female and male workers in each country using the information in the ECHP, where individuals are asked about whether medical insurance or health care is provided by the employer (free or subsidized).

hypothesis is that in societies with high obesity rates, we should expect to find low labor market penalties associated to obesity.

On the other hand, we define the degree of social interactions as how often individuals meet friends or relatives not living with them (Costa-Font and Gil, 2004)[13]. However, we use this at the country level, as a crude measure for the intensity of a country's social life. Hence, it seems intuitive to think of countries where individuals meet friends more frequently as those countries where social interactions are also more important. If we are willing to assume that body size concerns are more important in countries with more social interactions, and the ability to interact with people is valued in the labor market, we should expect to find higher labor market penalties for obese people in countries with higher levels of social interaction.

Figure 1, in the appendix, contains 8 graphs illustrating the relationship between labor market institutions and obesity labor market outcomes for men and women separately. Obesity labor market outcomes are the estimated coefficients from column (3) in Table 1B and Table 2[14]. Two interesting results arise from the graphs presented in Figure 1.

First, according to Graph 1.1, for women there is a positive association, albeit weak, between collective bargaining coverage (CBC) and the probability of being unemployed with respect to being an employee, but Graph 1.2 shows no clear relationship for men. Moreover, once we look at the associations between CBC and the obesity wage gaps for women and men in Graph 1.3 and Graph 1.4 respectively, we find a strong positive association for women and no clear relationship for men. For women, these results tend to be consistent with our previous hypothesis: the higher the CBC, the lower the ability by the firm to penalize obese female workers in terms of

[13] This variable is constructed using the question "How often do you meet friends or relatives not living with you, whether here at home or elsewhere?" and re-codifying the answers to (5) On most days, (4) Once or twice a week, (3) Once or twice a month, (2) Less often than once a month, and (1) Never.

[14] We do not report the associations for the estimated coefficients from Table 1A because any association between self-employment in different European countries and labor market institutions is very likely to be contaminated by differences in the regulatory system for starting own businesses across countries. However, these results are available from the authors upon request.

wages, so the firm applies this penalization through the hiring process. For men, no clear conclusion can be drawn.

Second, graphs 1.5 and 1.6 illustrate respectively two opposite strong signed associations - once we do not consider the two influential observations, Ireland in the case of women, and Belgium in the case of men- between employer-provided health care and the probability of being unemployed with respect to being an employee. In terms of wages (Graph 1.7 and Graph 1.8), no clear relationship emerges either for women or men. Once again, for women, these results seem to be to some extent consistent with our previous hypothesis: the higher the employer-provided health care, the higher the penalization through the hiring process, since firms tend to incorporate in their hiring decisions the higher expected health care costs associated to obese workers. For men, the opposite striking result is drawn in Graph 1.6: the higher the employer-provided health care, the lower the penalization through the hiring process. Unfortunately, we do not have a satisfactory explanation for such a result.

Overall, the reported evidence suggests that labor market institutions can have unintended negative and positive effects for obese female workers: negative in terms of finding a job, positive in terms of increasing their relative wages.

The appendix also contains Figure 2, which presents 8 graphs illustrating the relationship between cultural factors and obesity labor market outcomes for men and women separately. As we explained before, two indicators for cultural factors have been defined: prevalence of obesity and social interactions.

The results regarding the prevalence of obesity and obesity labor market outcomes are shown in graphs 2.1-2.4. The prevalence of obesity is negatively associated with the relative probability of being unemployed for both men (excluding the influential observation of Belgium) and women, which is in favor of our hypothesis about the social acceptability of obesity: the higher the prevalence of obesity, the higher the social acceptability of it, and hence the lower the penalties for obese people in the society, and in particular in the labor market. Nevertheless, Graph 1.3 shows that a higher prevalence of obesity is associated with a higher wage penalty for obese female workers. This does not need to be inconsistent with our previous hypothesis, if one is willing to assume the existence of negative spillovers: the higher the prevalence of obesity among workers, the lower the productivity of a firm. For obese male workers, the higher the prevalence of obesity, the higher their wage premium. However, we do not want to push this interpretation too much.

Finally, graphs from 1.5 to 1.8 present the associations between labor market outcomes and a crude indicator of social interactions (frequency of meetings with friends and relatives, see footnote 13). On the one hand, looking at graphs 1.5 and 1.7, it seems to be the case that no clear relation is observed for women. On the other hand, we can realize that, for obese males, the probability of being unemployed with respect to being an employee is negatively related with the degree of social interactions (Graph 1.6). However, it is difficult to assess which kind of relation exists between the obesity wage premium and the degree of social interactions. If one assumes that Ireland can be considered an outlier, then we get a negative relationship, which may be at odds with the association regarding employment status. If, on the contrary, it is not assumed that Ireland is an outlier, then a non-linear relationship cannot be discarded.

In general, some evidence is found on the role of culture on obesity labor market outcomes: prevalence of obesity seems to be related to the social acceptance of obesity, which may be translated to labor market outcomes for obese people. Nevertheless, any conclusion taken from this whole analysis is limited by two main factors. First, although the qualitative results can be useful to think more carefully on the role of cultural factors and labor market institutions, we are only exploiting the 7-9 pieces of available information in order to capture country specific factors, and hence the statistical rigor of such an approach is null. Second, the scatter plots are drawn with many non-statistically significant coefficients.

5. Discussion

This article has examined the associations between obesity, employment status (employment, self-employment, and unemployment) and wages for several European countries. Moreover, it has analyzed somewhat the role of culture and labor market institutions on such associations.

From this empirical analysis, four main results should be emphasized. First, there is weak evidence that obese workers are more likely to be unemployed or tend to be more segregated in self-employment jobs than their non-obese counterparts. Second, our reported estimates also indicate it is extremely difficult to detect statistically significant associations between obesity and wages. Third, the associations tend to be different for men and women, particularly those regarding unemployment and wages. Fourth, these same associations seem to be heterogeneous across countries and can be somewhat explained by the role of some labor market institutions, such as collective bargaining coverage and employer-provided health insurance.

Our paper complements previous studies analyzing the relationship between obesity and labor market outcomes (wages in d'Hombres and Brunello, 2005; employment and labor force participation in Sousa, 2005) using the ECHP, but in which the effect of obesity on such outcomes is assumed to be the same across countries, only allowing differences between Northern and Southern European countries. It also complements the recent work by Lundborg et al. (2006) on the effect of obesity on occupational attainment for people aged 50 and above in Europe. Moreover, our study illustrates that, without restricting the relationship between obesity and labor market outcomes to be equal across countries or groups of countries, the statistically significance of such associations is low.

There are fruitful avenues for further research. First, studying the effect of obesity on wages across countries within different occupations (for example, white versus blue collar workers) might show more statistically significant associations. Second, exploring the effect of obesity on wages across countries in different parts of the wage distribution through Quantile regression might provide some new information, since wage penalties might be different in different parts of the wage distribution because the position of a worker in the wage distribution reflects characteristics of her job. We think that such extensions can shed light on the relationship between obesity and wages across European countries.

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APPENDIX

Descriptive Statistics: AUSTRIA

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	5,949	39.46	8.35	5,859	39.04	8.39
Third Level Education (ISCED 5-7)	5,949	0.09	0.29	5,859	0.08	0.27
Second Stage of Secondary Level Education (ISCED 3)	5,949	0.66	0.47	5,859	0.81	0.39
Less than Second Stage of Secondary Education (ISCED 0-2)	5,949	0.25	0.43	5,859	0.11	0.32
Body Mass Index	5,949	23.93	4.08	5,859	25.75	3.42
Prevalence of obesity (BMI>= 30)	5,949	0.08	0.28	5,859	0.11	0.31
Participation in the Labor Force	5,949	0.69	0.46	5,859	0.92	0.27
Employee (working for an employer more than 15 hours/week)	4,263	0.79	0.41	5,601	0.81	0.40
Self-Employed (working more than 15 hours/week)	4,263	0.16	0.37	5,601	0.15	0.36
Unemployed	4,263	0.04	0.21	5,601	0.04	0.19
Log (Hourly Wage)	1,978	4.50	0.38	3,093	4.72	0.35

Descriptive Statistics: BELGIUM

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	5,056	39.59	8.06	4,539	40.12	8.04
Third Level Education (ISCED 5-7)	5,056	0.43	0.49	4,539	0.41	0.49
Second Stage of Secondary Level Education (ISCED 3)	5,056	0.33	0.47	4,539	0.34	0.47
Less than Second Stage of Secondary Education (ISCED 0-2)	5,056	0.24	0.43	4,539	0.25	0.43
Body Mass Index	5,056	23.69	4.36	4,539	25.45	3.92
Prevalence of obesity (BMI>= 30)	5,056	0.09	0.28	4,539	0.11	0.32
Participation in the Labor Force	5,056	0.71	0.45	4,539	0.91	0.28
Employee (working for an employer more than 15 hours/week)	4,033	0.79	0.41	4,344	0.81	0.39
Self-Employed (working more than 15 hours/week)	4,033	0.09	0.29	4,344	0.14	0.34
Unemployed	4,033	0.12	0.33	4,344	0.05	0.22
Log (Hourly Wage)	903	5.72	0.29	1,211	5.81	0.32

Descriptive Statistics: DENMARK

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	4,460	39.17	8.54	4,495	39.41	8.46
Third Level Education (ISCED 5-7)	4,460	0.34	0.47	4,495	0.31	0.46
Second Stage of Secondary Level Education (ISCED 3)	4,460	0.52	0.50	4,495	0.55	0.50
Less than Second Stage of Secondary Education (ISCED 0-2)	4,460	0.14	0.35	4,495	0.14	0.35
Body Mass Index	4,460	23.99	4.09	4,495	25.34	3.48
Prevalence of obesity (BMI>= 30)	4,460	0.09	0.28	4,495	0.09	0.29
Participation in the Labor Force	4,460	0.82	0.38	4,495	0.90	0.29
Employee (working for an employer more than 15 hours/week)	3,936	0.89	0.31	4,197	0.88	0.32
Self-Employed (working more than 15 hours/week)	3,936	0.04	0.18	4,197	0.09	0.28
Unemployed	3,936	0.07	0.26	4,197	0.03	0.18
Log (Hourly Wage)	1,402	4.39	0.27	2,556	4.48	0.27

Descriptive Statistics: FINLAND

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	4,711	40.62	8.56	4,666	40.47	8.57
Third Level Education (ISCED 5-7)	4,711	0.44	0.50	4,666	0.32	0.47
Second Stage of Secondary Level Education (ISCED 3)	4,711	0.41	0.49	4,666	0.49	0.50
Less than Second Stage of Secondary Education (ISCED 0-2)	4,711	0.16	0.36	4,666	0.19	0.39
Body Mass Index	4,711	24.74	4.40	4,666	25.98	3.67
Prevalence of obesity (BMI>= 30)	4,711	0.12	0.32	4,666	0.12	0.32
Participation in the Labor Force	4,711	0.81	0.39	4,666	0.90	0.30
Employee (working for an employer more than 15 hours/week)	4,118	0.81	0.39	4,443	0.74	0.44
Self-Employed (working more than 15 hours/week)	4,118	0.11	0.32	4,443	0.21	0.41
Unemployed	4,118	0.07	0.26	4,443	0.05	0.22
Log (Hourly Wage)	1,487	3.79	0.30	2,238	3.93	0.33

Descriptive Statistics: GREECE

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	9,249	39.33	8.69	8,929	39.29	8.68
Third Level Education (ISCED 5-7)	9,249	0.18	0.38	8,929	0.21	0.41
Second Stage of Secondary Level Education (ISCED 3)	9,249	0.35	0.48	8,929	0.37	0.48
Less than Second Stage of Secondary Education (ISCED 0-2)	9,249	0.47	0.50	8,929	0.42	0.49
Body Mass Index	9,249	24.50	4.06	8,929	26.19	3.39
Prevalence of obesity (BMI>= 30)	9,249	0.08	0.27	8,929	0.10	0.29
Participation in the Labor Force	9,249	0.52	0.50	8,929	0.91	0.29
Employee (working for an employer more than 15 hours/week)	5,359	0.56	0.50	8,535	0.54	0.50
Self-Employed (working more than 15 hours/week)	5,359	0.33	0.47	8,535	0.41	0.49
Unemployed	5,359	0.11	0.32	8,535	0.05	0.22
Log (Hourly Wage)	1,595	7.06	0.37	2,692	7.25	0.40

Descriptive Statistics: IRELAND

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	5,055	39.40	8.65	4,841	39.50	8.64
Third Level Education (ISCED 5-7)	5,055	0.20	0.40	4,841	0.20	0.40
Second Stage of Secondary Level Education (ISCED 3)	5,055	0.41	0.49	4,841	0.38	0.48
Less than Second Stage of Secondary Education (ISCED 0-2)	5,055	0.39	0.49	4,841	0.42	0.49
Body Mass Index	5,055	24.39	4.14	4,841	25.98	3.42
Prevalence of obesity (BMI>= 30)	5,055	0.09	0.29	4,841	0.10	0.30
Participation in the Labor Force	5,055	0.57	0.50	4,841	0.88	0.33
Employee (working for an employer more than 15 hours/week)	2,982	0.89	0.31	4,552	0.70	0.46
Self-Employed (working more than 15 hours/week)	2,982	0.07	0.25	4,552	0.24	0.42
Unemployed	2,982	0.04	0.20	4,552	0.07	0.25
Log (Hourly Wage)	1,586	1.75	0.38	2,056	1.95	0.44

Descriptive Statistics: ITALY

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	15,937	38.61	8.72	15,708	38.43	8.66
Third Level Education (ISCED 5-7)	15,937	0.12	0.32	15,708	0.11	0.32
Second Stage of Secondary Level Education (ISCED 3)	15,937	0.43	0.50	15,708	0.42	0.49
Less than Second Stage of Secondary Education (ISCED 0-2)	15,937	0.45	0.50	15,708	0.47	0.50
Body Mass Index	15,937	23.13	3.69	15,708	25.27	3.33
Prevalence of obesity (BMI>= 30)	15,937	0.05	0.22	15,708	0.07	0.26
Participation in the Labor Force	15,937	0.51	0.50	15,708	0.85	0.36
Employee (working for an employer more than 15 hours/week)	9,371	0.70	0.46	14,517	0.65	0.48
Self-Employed (working more than 15 hours/week)	9,371	0.16	0.37	14,517	0.26	0.44
Unemployed	9,371	0.14	0.35	14,517	0.09	0.28
Log (Hourly Wage)	2,295	2.36	0.33	4,201	2.51	0.33

Descriptive Statistics: PORTUGAL

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	10,515	39.24	8.85	10,293	38.19	8.80
Third Level Education (ISCED 5-7)	10,515	0.13	0.34	10,293	0.08	0.27
Second Stage of Secondary Level Education (ISCED 3)	10,515	0.13	0.34	10,293	0.13	0.34
Less than Second Stage of Secondary Education (ISCED 0-2)	10,515	0.74	0.44	10,293	0.78	0.41
Body Mass Index	10,515	24.78	4.24	10,293	25.78	3.34
Prevalence of obesity (BMI>= 30)	10,515	0.11	0.31	10,293	0.09	0.29
Participation in the Labor Force	10,515	0.69	0.46	10,293	0.90	0.29
Employee (working for an employer more than 15 hours/week)	7,743	0.76	0.43	9,603	0.74	0.44
Self-Employed (working more than 15 hours/week)	7,743	0.18	0.38	9,603	0.23	0.42
Unemployed	7,743	0.07	0.25	9,603	0.03	0.18
Log (Hourly Wage)	3,630	6.2	0.48	5,381	6.43	0.43

Descriptive Statistics: SPAIN

Variable	Female N	Female Mean	Female Std. Dev.	Male N	Male Mean	Male Std. Dev.
Age	12,110	38.20	8.66	11,890	38.08	8.52
Third Level Education (ISCED 5-7)	12,110	0.28	0.45	11,890	0.27	0.44
Second Stage of Secondary Level Education (ISCED 3)	12,110	0.19	0.39	11,890	0.21	0.41
Less than Second Stage of Secondary Education (ISCED 0-2)	12,110	0.53	0.50	11,890	0.51	0.50
Body Mass Index	12,110	23.96	4.13	11,890	26.11	3.71
Prevalence of obesity (BMI>= 30)	12,110	0.09	0.28	11,890	0.13	0.34
Participation in the Labor Force	12,110	0.50	0.50	11,890	0.86	0.35
Employee (working for an employer more than 15 hours/week)	6,938	0.71	0.46	11,092	0.72	0.45
Self-Employed (working more than 15 hours/week)	6,938	0.13	0.34	11,092	0.20	0.40
Unemployed	6,938	0.16	0.37	11,092	0.09	0.28
Log (Hourly Wage)	3,095	6.70	0.45	6,001	6.89	0.45

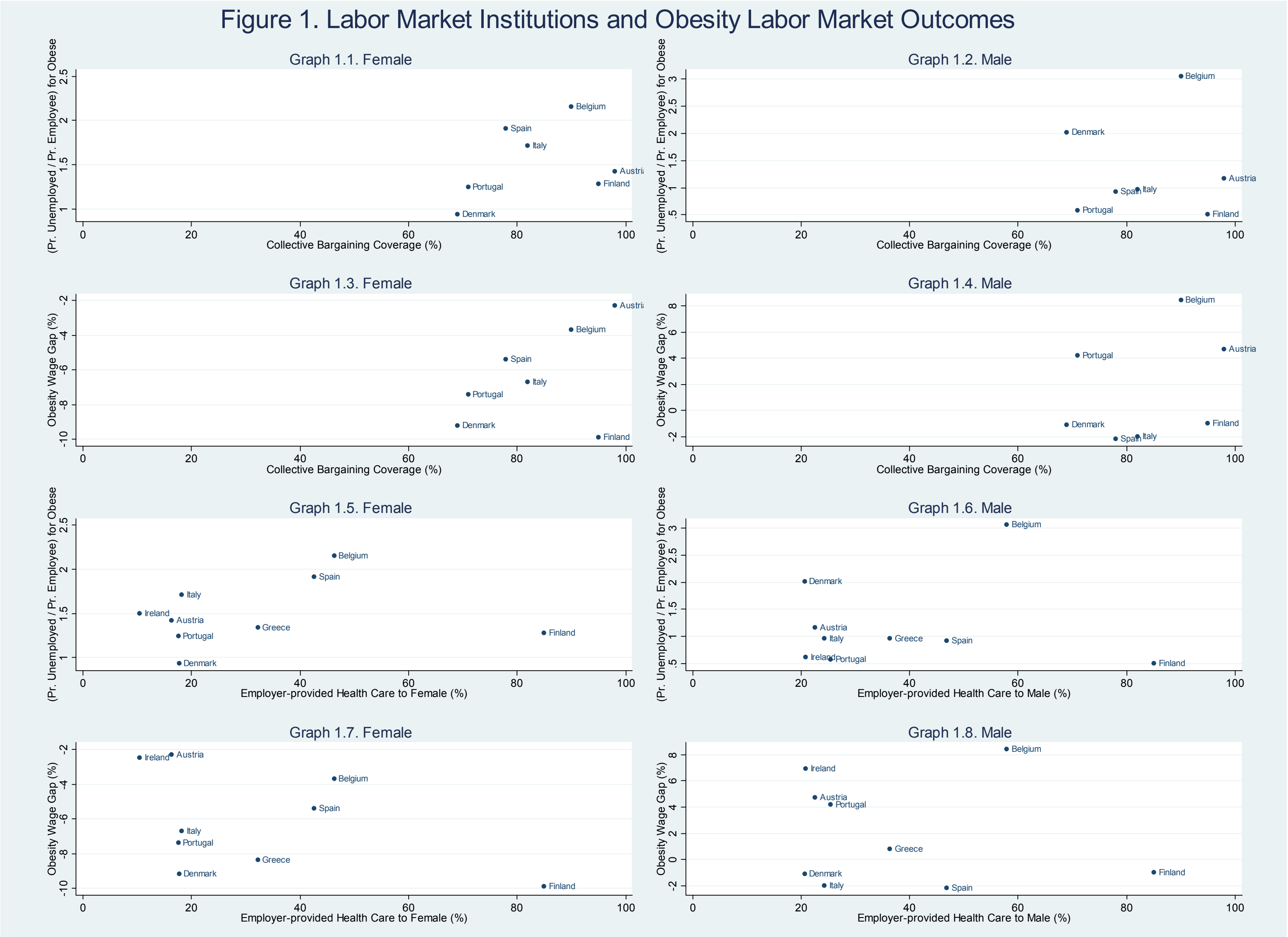
Figure 1. Labor Market Institutions and Obesity Labor Market Outcomes
Graph 1.1. Female
Graph 1.2. Male
Graph 1.3. Female
Graph 1.4. Male
Graph 1.5. Female
Graph 1.6. Male
Graph 1.7. Female
Graph 1.8. Male
(Pr. Unemployed / Pr. Employee) for Obese
Obesity Wage Gap (%)
Collective Bargaining Coverage (%)
Employer-provided Health Care to Female (%)
Employer-provided Health Care to Male (%)
Belgium
Spain
Italy
Austria
Finland
Portugal
Denmark
Ireland
Greece

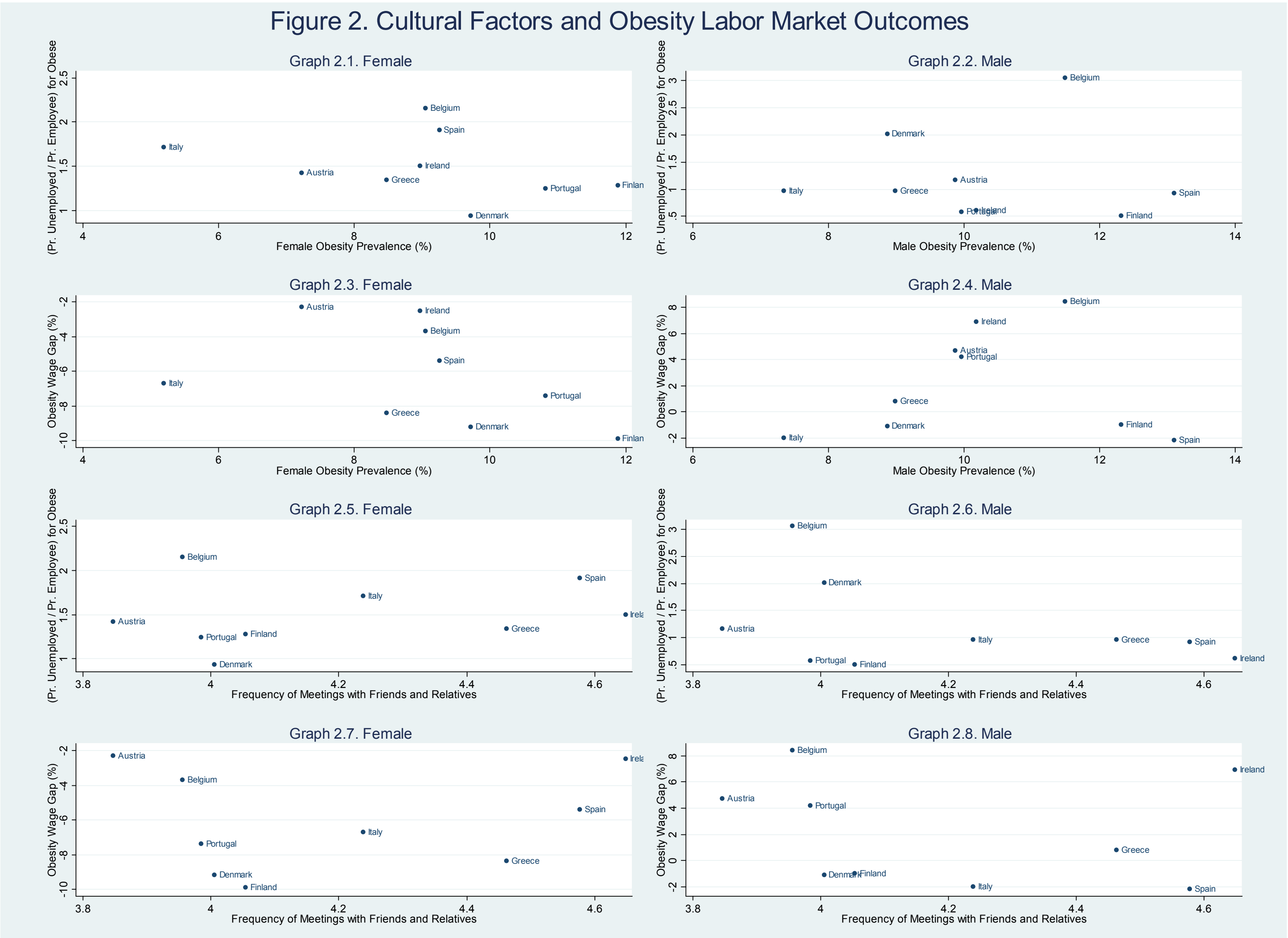

Figure 2. Cultural Factors and Obesity Labor Market Outcomes
Graph 2.1. Female
Graph 2.2. Male
Graph 2.3. Female
Graph 2.4. Male
Graph 2.5. Female
Graph 2.6. Male
Graph 2.7. Female
Graph 2.8. Male
(Pr. Unemployed / Pr. Employee) for Obese
Obesity Wage Gap (%)
Female Obesity Prevalence (%)
Male Obesity Prevalence (%)
Frequency of Meetings with Friends and Relatives
Belgium
Spain
Italy
Ireland
Austria
Greece
Portugal
Finland
Denmark