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Obesity and labour market success in Finland: The difference between having a high BMI and being fat

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ABSTRACT

This paper examines the relationship between obesity and labour market success in Finland, using various indicators of individual body composition along with body mass index (BMI). Weight, height, fat mass and waist circumference are measured by health professionals. We find that only waist circumference has a negative association with wages for women, whereas no obesity measure is significant in the linear wage models for men. However, all measures of obesity are negatively associated with women's employment probability and fat mass is negatively associated with men's employment probability. We also find that the use of categories for waist circumference and fat mass has a substantial influence on the results. For example, the category for high fat mass is associated with roughly 5.5% lower wages for men. All in all, the results indicate that in the absence of measures of body composition, there is a risk that labour market penalties associated with obesity are measured with bias.

1. Introduction

Many studies document the negative effects of obesity on labour market success measured by wages and employment (Atella et al., 2008; Baum and Ford, 2004; Brunello and D'Hombres, 2007; Cawley, 2004, 2007; Cawley and Danziger, 2005; Conley and Glauber, 2006; Garcia and Quintana-Domeque, 2006; Han et al., in press; Härkönen, 2007; Morris, 2007; Kennedy and Garcia, 1994; Sarlio-Lähteenkorva et al., 2004). For reasons of data availability, this literature has used body mass index (BMI) as a measure of obesity.[1] However, it is difficult to determine whether the labour market penalties for obesity are due to discrimination or health reasons such as the limited ability to work. One reason for this is that BMI blurs the distinction between fat and fat-free mass such as muscle and bone (Burkhauser and Cawley, 2008). In the medical literature, BMI alone is not considered to be a valid measure of obesity nor a sufficient predictor of obesity-related health outcomes (Burkhauser and Cawley, 2008; Yusuf et al., 2005).

This paper re-examines the relationship between obesity, wages and employment, using indicators of individual body composition along with BMI. The indicators we use are fat mass expressed as kilograms of fat and waist circumference. Waist circumference distinguishes individuals who have a high fat mass with the bulk of the fat concentrated around the waist compared with those with a lot of fat that is more evenly distributed around the body. A large waist circumference in relation to height may be interpreted by employers as a non-attractive physical appearance, which has been found to be associated with

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[1] Body mass index is calculated as a person's weight in kilograms divided by height in meters squared.

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lower earnings (Hamermesh and Biddle, 1994). The reason for this is that the fat concentrated around the waist is more visible than fat in general. Moreover, waist circumference measures fat that is visceral (i.e. around the internal organs), which is especially harmful to health (Kopelman, 2000). Therefore, it is challenging to distinguish different channels of influence even with the use of measures of body composition.

We use data from the "Health 2000 in Finland" data set, a cross-section of about 8000 people above the age of 30. (Aromaa and Koskinen, 2004, provide a description of the data set.[2]) This data set contains information on individual fat mass measurements obtained from an eight-polar bioelectrical impedance analysis, which is performed by running a small constant current through the body (Scharfetter et al., 2004). Resistance, or impedance, is higher in fat than in other types of tissue, which makes it possible to calculate the proportion of fat mass in the body.

An advantage of the data is that it contains information not only on fat mass but also on other measures of obesity. The few existing studies of fat mass and labour market success (Burkhauser and Cawley, 2008; Heineck, 2007; Wada and Tekin, 2007) have almost exclusively relied on prediction equations for the measures of body composition as a function of electrical resistance as well as height and weight and some other variables.[3] This approach is not as accurate as one based on actual measurements.[4]

Annual individual wage data originating from the Finnish tax authorities have been linked to the Health 2000 data set, using the personal identification number that every person residing in Finland has.[5] This is another advantage over most of the earlier studies in this field of research, because almost all of them have used survey-based information on earnings that is prone to non-response and reporting bias.

Nonetheless, our data has two shortcomings. First, we are using a cross-sectional data. Thus, we cannot estimate fixed effects models that would account for unobservable heterogeneity at the individual level. Second, we lack a valid instrument.[6] Hence, we cannot estimate causal effects and address the possibility that the obesity measures may be endogenous (Averett and Korenman, 1996; Cawley, 2004; Wada and Tekin, 2007). Accordingly, this paper documents associations or correlations between different measures of obesity and labour market success.[7] The Finnish evidence is of broader interest, because the prevalence of overweight and obesity has increased rapidly among both men and women during the past few decades (Böckerman et al., 2008). The increase in obesity in Finland has not been as rapid as in USA. Despite this, the share of obese adults is higher in Finland than in other Nordic countries (Audretsch and DiOrio, 2007).

2. Data and empirical approach

The "Health 2000" population survey data set was collected in order to give a comprehensive picture of the health and functional ability of the working-age and old-age Finnish population. The data set is a random sample of 10,000 adults from the entire country, and the information was collected between September 2000 and June 2001 by means of personal interviews, telephone interviews, and professional health examinations. Importantly, all measures of obesity originate from professional health examinations conducted at local health centres. Supplementary information has been obtained from various government registers.

The sampling design included regional clustering. A stratified two-stage sampling design was used with local Health Centre Districts (comprising one or several municipalities) as the first-stage sampling units (i.e. regional clusters). There were a total of 249 regional clusters in the population. Fifteen certainty strata (the 15 largest towns) in total were first formed as clusters with a probability of one. The remaining 234 clusters were then divided into five regional strata, covering the whole of (mainland) Finland. A total of 65 clusters were drawn from these strata by systematic probability proportional to size (PPS) sampling with inclusion probabilities proportional to the size of the target population in a cluster. Thus, the total number of strata and first-stage sample clusters was 20 and 80, respectively (Aromaa and Koskinen, 2004). The second-stage sample (8028 people aged 30 years or over) was allocated proportionally to the strata. People aged 80 or over were over-sampled with a double inclusion probability relative to the younger age groups. Finally, individual persons were selected from each stratum with systematic sampling from an implicitly stratified frame register. Roughly 88% of the sample persons were interviewed, 80% attended a comprehensive health examination and 5% attended a condensed examination at home. The most essential information on health and functional capacity was obtained from 93% of the subjects.

We have limited the focus to individuals aged between 30 and 54, because we are interested in labour market

[2] The data set is available from the National Public Health Institute in Finland (see http://www.terveys2000.fi/indexe.html).

[3] Burkhauser and Cawley (2008) use a data set (NHANES III) that includes measures of bioelectrical impedance analysis those are available in the same data set as the other measures of obesity. Their paper also estimates models of fatness and employment that are related to our models of employment.

[4] There are problems with this type of prediction approach. Firstly, there is some disagreement in the literature about what the best prediction equation for the measures of body composition is (Willett et al., 2006). Secondly, imputed body fat measures may not differ much from BMI, because imputed body fat is usually calculated as a non-linear transformation of weight and height (and their squares and cubes) and some other variables. Thirdly, the imputation equation may contain some of the same variables as the wage equation, which makes it rather hard to interpret the correlations observed in the wage equation.

[5] The data set originates from the Finnish tax administration (see http://www.vero.fi/).

[6] For example, in our case it is not possible to use area-level obesity as instrument (Morris, 2007), because the number of individuals in the data for each region (249 regional clusters) is too small in order to construct a valid and powerful instrument.

[7] Rooth (in press) provides experimental evidence about the discrimination of obese applicants in hiring.