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When does weight matter most?

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ABSTRACT

Past empirical work establishes a wage penalty from being overweight. In this paper, I exploit variation in an individual's weight over time to determine the age when weight has the largest impact on labor market outcomes. For white men, controlling for weight at younger ages does not eliminate the effect of older adult weight on wage: being overweight as a young adult only adds an additional penalty to adult wages. However, for white women, what they weigh in their early twenties solely determines the existence of an adult wage penalty. The female early-twenties weight penalty has a persistent effect on wages, and differences in marital characteristics, occupation status, or education cannot explain it. It also is not a proxy for intergenerational unobservables.

1. Introduction

A large literature has established that those who are overweight tend to earn less than their average-sized counterparts, and studies have proposed several explanations for this observed correlation.[1] However, prior research has not asked whether the wage penalty is a consequence of being overweight *now* or of being overweight in the *past*? The distinction is important because the potential remedy for lower wages among the obese depends on the timing of the wage penalty from weight. For policy makers seeking to improve population health and nutrition, targeting the age group for which weight matters most for labor market outcomes will yield greater returns to policy intervention.

In this paper, I start by estimating the magnitude of the wage penalty from weight. I show that for white, non-Hispanic men and women, being in the third tercile of one's gender-specific cohort BMI distribution is associated with having 6–9% lower wages, an estimate consistent with the existing literature. Then to tease apart the effects of past versus current weight on wages, I use the fact that weight varies over time: a relatively fit young adult may become an overweight adult, and an overweight adult may become a fit adult. This time variation allows me to determine the age at which being overweight most strongly establishes future wage disparity.

I find that the results differ between men and women. For men, I document a small wage penalty from being overweight as a young adult and a large wage penalty from being underweight as a young adult. Conditional on young-adult weight, the wage penalty from being overweight as an adult remains. I then show that any penalty on adult wage from being overweight as a young adult disappears when various characteristics of young-adult occupation are held constant, which suggests that the young-adult wage penalty from being overweight is complementary with vocational status, broadly defined. For robustness, I test for the effect of future weight on current wage and find that wages today are correlated with future weight. Hence I cannot rule out the possibility that the male wage penalty from weight is proxying a penalty from some unobserved endogenous variable.

On the other hand, for women, I find that weight during one's early twenties determines whether an observable wage penalty from weight will carry into adulthood. When holding constant early-twenties weight, neither early childhood nor adult weight are correlated with wages. And unlike for men, the wage penalty from weight for females in their twenties is not complementary with occupation ranking, but instead holds true across all occupational rankings, education levels, and marital statuses. Furthermore, I show that for women, future weight is virtually uncorrelated with current wage, meaning those who are thin in their twenties but

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[1] Table 2 of Finkelstein et al. (2005) provides a detailed documentation of the literature on the effect of body weight on earnings by gender.

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become heavy later are distributed identically to those who are thin in their twenties and remain thin. This finding suggests the young-adult weight penalty for women is accurately estimated and not merely a product of unobservables. I conclude that mechanisms for the development of the female weight penalty necessarily arise from wage determinants correlated with young-adult weight.

For both men and women, all results hold true when controlling for family background covariates, so even though those with healthier BMIs may be endowed with more favorable characteristics, such as better family resources, higher intellectual ability, or more work energy, family background is not the channel through which weight affects market outcomes.

The remaining structure of this paper is as follows: Section 2 discusses the empirical framework. Section 3 provides an overview of the data. Section 4 examines the results. Section 5 concludes.

2. Empirical framework

2.1. Estimation strategy

Consider a random sample of adults all weighing the same. Some will have lost weight over time, whereas others will have gained weight over time. This variation in relative weight over time allows me to identify the following equation:

$$\ln(\text{wages}_{it}) = \beta_0 + \beta_1 BMI_{it} + \beta_2 BMI_{i,t-a} + \Gamma X_i + \in_{it}, \quad (1)$$

where i is an index for the individual, and t is an index for the year. BMI_{it} denotes the BMI measure of individual i in year t, and $BMI_{i,t-a}$ is individual i's past BMI in year $(t–a)$. X_{it} is a vector of individual and family background covariates, and ε_{it} is a mean zero random error.

I first run the regression without the past BMI measures ($BMI_{i,t-a}$).[2] Then I add in past BMI measures to examine whether past weight can lower the contemporaneous weight penalty. If it does, I conclude past BMI measures explain why weight lowers wages.

At first, I avoid controlling for education, work experience, and marital status. This approach is consistent with Neal and Johnson (1996), Heckman (1998), Persico et al. (2004), and Case and Paxson (2008), who all argue against accounting for differences in decision variables when estimating the effect of labor market discrimination. These authors claim that including variables such as work experience, education, and occupation misstates the wage effects of discrimination because those variables are subject to worker choice and can be contaminated by current labor market discrimination. For example, if overweight workers are discriminated against in the labor market and if being overweight causes them to also choose different jobs and job-training opportunities, including occupation and experience controls can bias the estimate of the impact of weight on wage.

Although my paper is not solely on discrimination, my goal is to estimate the total effect of weight on wage—not the partial effect of weight on wage conditional on education, occupation, and marital choices and their effects on wage. Hence, in the most general specification, I prefer to omit these variables from the reduced-form wage equation, controlling for only exogenous or predetermined determinants of wage that are correlated with wage. Later, I add in controls for educational attainment, occupation characteristics, and marital status to examine how much these factors can account for of the variation in wages weight explains.

2.2. Estimation implications

Comparing the relative magnitudes of β_1 (effect of current weight on wage) and β_2 (effect of past weight on wage) from Eq. (1) indicates whether current or past weight affects wages more. In this subsection, I consider the two extremes—when only current weight matters versus when only past weight matters—to understand the bounds on the set of β_1 and β_2 combinations I expect to find. I also discuss what implications my results have for understanding how the mechanisms underlying the obesity wage penalty operate.

2.2.1. Case 1: only current weight matters

When only current weight matters, β_1 is non-zero and β_2 is zero. In this case, two adults with the same BMI will have the same hourly pay, regardless of whether one was fit in the past and the other was overweight. Hence, mechanisms explaining the existence of the weight penalty should address why current weight but not past weight matters.

Several mechanisms proposed in the literature on the obesity-associated wage difference fit this criterion. For example, management can wrongly deny physically less attractive workers certain positions or pass them over for promotions (Mobius and Rosenblat, 2006; Puhl and Brownell, 2001). Alternatively, overweight workers might complete tasks more slowly, justifying lower wages (Everett, 1990). Finally, management might make obese workers with employer-sponsored health insurance pay for their higher expected medical expenditures through lower cash wages (Bhattacharya and Bundorf, 2009).[3] Since past weight is uncorrelated with current wages, explanations such as overweight individuals obtaining less education cannot explain the development of the weight penalty.

Although my results cannot pinpoint the magnitude of importance for each these mechanisms, the finding that only current weight matters implies these mechanisms cannot have long-term consequences. For example, if taste-based discrimination causes the wage penalty for weight, initial job rejections based on discrimination cannot limit future earnings as long as the worker does not become overweight in the future. Similarly, being less productive now because one is overweight should have no capacity constraints on future productivity levels.

2.2.2. Case 2: only past weight matters

When only past weight matters, β_1 is zero and β_2 is non-zero. Regardless of adult weight, those who were thin in the past earn higher wages. This finding suggests weight at a particular age will establish an individual's specific lifetime earnings profile track.

Here, explanations for the wage penalty from weight should pertain to factors developed at the age when weight started to matter. If controlling for childhood or teen weight eliminates the effect of adult weight on wage, then determinants of wage as a youth explain the existence of an adult weight penalty. For example, non-cognitive skills often stabilize in the formative years, so being overweight as a teen might result in persistently lower levels of social ability, self-confidence, and communication, leading to lower future wages (Heckman, 2006; Mobius and Rosenblat, 2006). Alternatively, being overweight can serve as a proxy for other unobservables such as having a high discount rate. Those with high discount rates not only have a higher probability of being overweight, but also tend to invest less in their own human capital,

[2] I estimate this model by OLS and report heteroskedastic-robust standard errors. Probit results for the binary dependent variables give similar results to those presented.

[3] Although Bhattacharya and Bundorf (2009) provide some theoretical arguments, differentiating between discrimination and productivity differentials is difficult because employer preferences for wage assignment and the process of job sorting are often unobserved.