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THE ECONOMIC REALITY OF *THE BEAUTY MYTH*

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ABSTRACT

We investigate income, marital status, and hourly pay differentials by body mass (kg/m^2) in a sample of 23 to 31 year olds drawn from the 1988 NLSY. Obese women have lower family incomes than women whose weight-for-height is in the "recommended" range. Results for men are weaker and mixed. We find similar results when we compare same-sex siblings in order to control for family background (e.g., social class) differences. Differences in economic status by body mass for women increase markedly when we use an earlier weight measure or restrict the sample to persons who were single and childless when the early weight was reported. There is some evidence of labor market discrimination against obese women. However, differences in marriage probabilities and in spouse's earnings account for 50 to 95 percent of their lower economic status. There is no evidence that obese African American women suffer an economic penalty relative to other African American women.

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Eating disorders (such as anorexia nervosa and bulimia) are a major social problem in the United States. Estimates of the prevalence of anorexia nervosa range from 1 to 4 percent of the female population (Autry et al. 1986). Although estimates of the prevalence of bulimia nervosa run as high as twenty percent of college and high school females, studies based on representative samples suggest the actual proportion is less than five percent of college females and less than 1.5 percent of males.[1] Concern about eating disorders has led to a recent explosion of consciousness-raising efforts, perhaps best exemplified by the best-selling book *The Beauty Myth* by Naomi Wolf.

There is also a growing awareness of the social stigma attached to being overweight (examples from the popular press include Kolata et al. 1993; Coleman, 1993; Lampert, 1993). These articles leave little doubt that Americans (especially women) experience great social and psychological pressure with respect to body size, and provide poignant accounts of ridicule and discrimination experienced by obese persons.

Economists have had little to say on the issue of body weight in contemporary industrialized societies; our search of the *Journal of Economic Literature* index uncovered only one study of obesity and economic outcomes, a cross-sectional analysis of wage rates (Register and Williams 1990).[2] The only other study of the effects of overweight on economic status we are aware of is the paper by Gortmaker et al. that appeared in the *New England Journal of Medicine* as we were completing the

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[1] In their review, Autry et al. (p. 537) report a prevalence of 5 percent of college and high school females and 1.5 percent of males but even these rates may be too high. Drewnoski et al. (1988) report a prevalence of 1 percent of college females and 0.2 percent of college males in a nationally representative sample of college students. The prevalence among female undergraduates living in group quarters on campus, the group at highest risk, was 2.2 percent.

[2] There are Development Economics and Economic History literatures on weight and stature. Short stature and low weight-for-height are indicators of nutritional deficits; height and weight, therefore, may be interpreted as indicators of the economic status of populations. For an excellent review, see Steckel 1991.

present study.[3] We summarize these studies below.

In this paper, we describe economic differentials by body mass for a sample of men and women aged 23 to 31 in 1988. In so doing, we hope to contribute to a literature that describes social and psychological pressures that may contribute to the development of eating disorders and to gender differences in prevalence rates.[4] Accurate information about economic differentials by body mass can aid in the formulation of appropriate public health and social policies. Raising awareness of the social and psychological pressures surrounding fear of weight gain, and of the stereotyping of obese persons, represent an important step in addressing associated social and public health problems; however, we hypothesize that attempts to change a variety of attitudes and behaviors surrounding body weight, including the social stigma attached to being overweight, eating disorders such as anorexia nervosa and bulimia, and obsession with body image, diet, and weight loss, will face greater difficulties if economic differences reinforce social and psychological pressures.[5]

That there is an economic aspect to behavior surrounding body weight would hardly be

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[3] For a discussion of the labor market effects of "appearance" broadly defined, see Hamermesh and Biddle (1993).

[4] For example, Autry et al. call for research to address "Psychological factors that influence the development and maintenance of anorexia nervosa and bulimia;" and "Genetic, environmental, and psychosocial studies that might elucidate why the phenomena are more prevalent among females (p 541)."

[5] For example, Sciacca et al. find in a survey of university students that, although 17 percent of women and 20 percent of men were above "normal" body weight, 40 percent of women and 24 percent of men considered themselves overweight. In addition, 53 percent of women and 20 percent of men reported experiencing a fair amount or great deal of discomfort from being overweight. Sciacca et al. recommend that efforts should be made to help students who are not over recommended weight-for-height, but who consider themselves overweight, to change perceptions or expectations about their bodies (p. 167). While changing self-perception may be an important step in combatting eating disorders, we must recognize the possibility that such students do not have "distorted body images," but rather, the discrepancy between recommended weight and self-perceived overweight may reflect an accurate perception of the social norms surrounding body weight. Put differently, there is no reason to think that social norms should conform to recommended weights that are, after all, based on mortality risks.

surprising. A recent *Business Week* article (Armstrong and Mallory, 1992) reported that U.S companies had 1991 sales of $8.4 billion in products and services for serious dieters. A less-restrictive definition that includes expenditures on items such as health club fees and artificial sweeteners raises the figure to $33 billion, roughly the GDP of Pakistan, Egypt or Hungary (World Bank, 1992, Table 3).

Naomi Wolf provides additional anecdotal evidence that U.S. college students invest heavily in weight-loss oriented human or social capital. She finds that audiences of (primarily) college women have little trouble answering a series of specific questions about the caloric content of different foods, the number of calories one must consume to lose weight at different rates, the number of calories consumed by different amounts of physical exercise, and so forth. An economist is naturally led to ask if there is an economic return to such investments. Two recent articles suggest that there is.

Register and Williams (1990) examine the effect of obesity on wage rates. They study a sample of 18 to 25 year olds from the 1982 round of the National Longitudinal Survey of Youth (NLSY). They classify as obese sample members who are 20 percent or more above ideal body weight (for height and sex). They report mean hourly wage differences of minus 16 percent for obese women and (positive) seven percent for obese men, compared to women and men who are not obese. In employment-selectivity corrected wage equations in which they control for race, union status, education, enrollment status, age, health status, marital status, region, recent work experience, and broad industrial category (three dummy variables), the pay differential falls to minus 12 percent for obese women, and to minus 5 percent for obese men. Register and Williams interpret their results as evidence of discrimination against obese women, although they are aware of other interpretations. In particular, they mention potential problems of endogeneity bias: "...the obese may have such status [obesity] *because* of low earnings, to the extent that income level affects food and nutritional

consumption behavior [p. 138, emphasis in original]."

We build upon and extend their analysis in several respects. First, we estimate differentials by body mass in family income, marital status, and spouse's earnings (if married) in addition to hourly wage rates. Second, we attempt to address the possibility of endogeneity bias in contemporaneous relations between economic status and body weight. Third, we compare same-sex siblings as a way to eliminate bias induced by unmeasured family background heterogeneity (e.g., social class).[6]

Gortmaker et al. estimate effects of obesity[7] on several social and economic outcomes in the NLSY. Because of the obvious parallels between their study and ours, we review their study in some detail.

Gortmaker et al. relate an indicator of obesity at ages 16 to 24 (BMI above 95th percentile of weight for height) to age 23 to 31 values of household income, years of education completed, an index of self-esteem (measured in 1987), and probabilities of being married, graduating from college, or being poor. In crude (unadjusted) comparisons to other women, obese women exhibit substantial disadvantages in all outcomes except self-esteem. When Gortmaker et al. use multivariate regressions to adjust the differentials for baseline (1979) values of income, education, marital status, maternal and

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[6]Register and Williams also note the need to repeat the analysis for an older sample (p. 139), presumably because the wages of young workers are highly variable (e.g., 35 percent of males and 40 percent of females in their sample were enrolled in school). Indications of the need for a reanalysis are provided by the small magnitude and lack of significance of several standard wage equation coefficients. For example, in the male wage equation, coefficients of black racial identification, union status, education, age, health status, marital status, and labor market experience are small and insignificant. Whether this result is due to the selectivity correction can not be determined from the information presented.

[7] In our paper, we use the term "obese" to refer to persons with Body Mass Indexes of 30 or more. We use the term "overweight" to refer to persons with BMIs between 24 and 29 for women, or 25 to 29 for men. Gortmaker et al. use the term "overweight" to refer to persons above the 95th percentile of NCHS standards of weight for height age and sex. Since this group corresponds closely to the group we refer to as "obese", in describing their study, we will use the term "obese."

paternal education, work-limiting chronic health conditions, height in 1981, self-esteem in 1980, age in 1981, and race or ethnic group, statistically significant differentials remain in marital status, income, poverty, and years of education; differences in later self-esteem and in the fraction completing college are small and not significant. Differences by obesity status for men are smaller and, except for the lower fraction married at ages 23 to 31 among men who were obese at ages 16 to 24, were not significant at the .01 level.

Gortmaker et al. investigate the importance of two explanations for the deficits in social and economic status among obese women. First, they find no evidence to support the hypothesis that obesity differentials are confounded by health status since controlling for work-related health limitations does not change their results. Second, they reject the hypothesis that socioeconomic origin or ability account for the obesity differentials because significant differentials in income, marriage, and years of education remained "after we controlled for base-line differences in potentially confounding factors" (p. 1011). Gortmaker et al. conclude that discrimination may explain the residual (adjusted) deficits in socioeconomic status among obese women (p. 1011). Thus, in the final paragraph of the paper, they offer the following conclusion and policy recommendation:

> In summary, overweight during adolescence has important social and economic consequences that are greater than those associated with many other chronic physical and health conditions. Discrimination against people who are overweight may account for these results. The recent Americans With Disabilities Act prohibits discrimination in employment and in establishments serving the public. Our data suggest that the extension of this act to include overweight persons should be considered. Our findings also emphasize the need for effective prevention of this increasingly prevalent condition.

Our study adds detail to theirs in five key areas. First, we estimate differences in hourly pay at ages 23 to 31. This wage analysis focuses on the area of central importance to labor market anti-discrimination policies such as the Americans With Disabilities Act. Gortmaker et al. do not study labor market outcomes. Like Register and Williams, we find evidence consistent with pay discrimination against obese women. We also find that obese women are more likely than other

women to report having experienced gender-based discrimination in the labor market.

Second, we use sibling differences as an alternative approach to controlling for social class or family background differences between obese persons and others. This technique (same-sex sibling differences) confirms the finding that family background differences do not account for the social and economic disadvantages experienced by obese women.

Third, we assess the relative contributions of marriage market and labor market differences to the overall income differences between obese persons and persons of "recommended" weight. This accounting exercise allows us to assess the potential for labor market anti-discrimination measures to increase the economic status of obese women. We find that marriage market differences account for the vast majority (as much as 95 percent) of their lower income; labor market differences account for between five and 35 percent, depending on the sample considered.

Fourth, we estimate "contemporaneous" (i.e., at ages 23 to 31) relationships between economic or social outcomes and body weight, in addition to relationships between outcomes at ages 23 to 31 and obesity at ages 16 to 25 (the latter are similar to those estimated by Gortmaker et al.). We show that relations between social and economic outcomes at ages 23 to 31 and obesity at ages 23 to 31 are much weaker than those between outcomes at ages 23 to 31 and obesity at ages 16 to 25. Women who were obese at ages 16 to 25 have lower economic status at ages 23 to 31. However, although most women who were obese at ages 16 to 25 were also obese at age 23 to 31 (as Gortmaker et al. note), only about 30 percent of women who were obese at age 23 to 31 were obese at age 16 to 25. Moreover, women who became obese in their mid to late twenties (the majority of women who are obese at ages 23 to 31) are substantially better-off financially than those who were obese at both ages, and do not differ greatly from those in the recommended weight range. We argue below that this finding implies that "contemporaneous" social and economic differentials are most likely <u>not</u> the result of adverse labor or marriage market outcomes causing weight gain; using an

earlier BMI measure (which should be less affected by reverse causality) strengthens the adverse association between obesity and economic status.

A final extension of previous research is our estimation of separate models by black or Hispanic identification of sample members. Unlike Gortmaker et al. who report that "The addition of interaction terms to the models to determine whether the relation of obese to subsequent social and economic characteristics varied according to race or ethnic group did not alter the results (p.1011)," we find statistically significant and large race differences in the obesity differentials; the social and economic penalties attached to being overweight appear to be much smaller among black women. We discuss this finding and others in the concluding section of the paper.

METHODS, DATA, VARIABLES

Endogeneity or simultaneity bias

Our general approach is to relate labor and marriage market outcomes such as wages, family income, and marital status to an individual's body mass. As noted, for women, high body mass is generally associated with lower family income, lower wages, lower probabilities of marriage, and lower spouse's earnings. A major concern is that these associations are not accurate representations of causal relations running from body mass to socioeconomic outcomes. In particular, endogenous or simultaneous determination of body mass could lead us to find a (spurious) negative correlation between body mass in a given year and income or marital status in the same year. For example, a person who loses a job or has difficulty finding a spouse may gain weight, resulting in a negative bias in the coefficient of an overweight dummy variable in a marriage or income equation.[8]

[8] Of course, the bias can go in either direction. For example, if marriage causes weight gain (possibly through its association with child bearing), then the coefficient of body mass in a marriage equation may be upward biased. In addition, if heavy single individuals come to believe their

We take advantage of the longitudinal nature of the NLSY data to gauge the direction of bias from simultaneous or endogenous determination of weight in models of social or economic status. It seems plausible to us that if the sources of negative endogeneity bias mentioned above are important, they should be less important if one uses an early value of the BMI, rather than a contemporaneous value, in equations describing economic status. In particular, if job market or marriage market problems cause weight gain, using an earlier measure of weight should reduce the biasing effects of such a process. Therefore, in addition to estimating relations between 1988 economic status and 1988 BMI (when sample members were aged 23 to 31), we also estimate relations between 1988 economic status and a BMI measure which is the average of 1981 and 1982 BMIs[9], when sample members were aged 16 to 25. To the extent that the 1988 BMI categories "overweight" or "obese" are, on balance, spuriously negatively correlated with 1988 economic outcomes, using the 1982 BMI measure rather than the 1988 measure should cause coefficients of these dummy variables to move in a positive direction (become less negative). As we shall see, especially for women, compared to the 1988 BMI measure, the 1982 BMI enters with substantially *larger* negative values in the income and marriage equations. This result suggests that, if anything, the estimated relationship between contemporary BMI and marriage or income is, on net, biased upward due to endogeneity or simultaneity.

To explore the problem of endogeneity bias further, we repeat our analyses for a subsample of persons who were single (never married) and childless (and not pregnant) at ages 16 to 25 (1982). Estimated relations between 1982 BMI and 1988 economic status and marital status for a subsample

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marriage prospects are poor, they may invest more in labor market human capital. If such investment is unmeasured, the estimated coefficient of body mass in a wage equation will be upward-biased (reflecting the greater unmeasured labor market human capital of heavier persons). We return to these possibilities in our empirical analyses below.

[9] Hereafter, to simplify exposition, we will refer to the average of the 1981 and 1982 BMIs as the 1982 BMI.

of single persons should be less influenced by effects of marriage and labor market outcomes on weight (i.e., less affected by bias from endogeneity or reverse causality). Also consistent with the hypothesis of a net upward bias in the contemporaneous associations, we find larger negative effects of BMI on the 1988 outcomes for the subsample of persons where were single and childless in 1982.

The NLSY data

The sample is derived from the National Longitudinal Survey of Labor Market Experience of Youth (NLSY), which has been conducted annually since 1979 (CHRR 1992). At baseline (1979), respondents were aged 14 to 21. The NLSY oversamples black, Hispanic, and economically disadvantaged non-black and non-Hispanic youths. Respondents were asked to report their current weight in the 1981, 1982, 1985, 1986, 1988, 1989, and 1990 interviews. Height information was collected in 1981, 1982, and 1985. Height information was not collected after 1985, presumably because individuals are assumed to have attained adult stature. (Sample members were aged 20 to 27 in 1985.)

We focus on labor market and marriage market outcomes measured in the 1988 interview. Our sample consists of 5090 women and 4951 men who were interviewed in 1988 and for whom we had the requisite height, weight, and hourly wage information (if they were employed; non-employed persons are also included in the sample).[10]

Variables

The explanatory variables of chief interest are categories of the Body Mass Index (BMI; Bray

[10] Of 11,602 potential respondents, 10,465 or 90.2 percent were interviewed in 1988 (CHRR 1992). Of these, we dropped 72 due to missing or implausible hourly wages (less than 1 dollar or greater than 100 dollars per hour) and 352 due to missing height information, yielding a total sample size of 10,041 men and women for our analyses.

1978), which is defined as weight in kilograms divided by the square of height in meters. Although there are many ways to combine height and weight to estimate amount of body fat, these ways tend to be highly correlated and are considered reliable (Kannel, 1983; National Center for Health Statistics, 1983). In addition, Bray reports a correlation between the BMI and various anthropometric measures (such as skinfold thickness) of 0.7 to 0.8.

We use BMI categories that correspond to weight-for-height tables formulated by Metropolitan Life Insurance Company (1983). The recommended (based on associated mortality risks) BMI range is 20-25 for men and 19-24 for women. We follow convention (Bray, 1979) in referring to persons below the recommended range as "underweight," men with BMIs between 25 and 29 and women with BMIs between 24 and 29 as "overweight," and men or women with BMIs 30 and over as "obese." We must emphasize that the recommended weight refers to a range associated with low mortality risks, and may not correspond to social norms about what might constitute an overweight or underweight appearance (Metropolitan Life Insurance Co., 1983). We adopt these ranges because they are conventional, widely used, and are a convenient way to classify the sample. The Metropolitan Life recommended weight tables are appropriate for individuals aged 18 to 30 (Greenwood, 1983); we use weight data for a sample aged 17 to 25 in 1982 and 23 to 31 in 1988.

We use two measures of the BMI: an average of the 1981 and 1982 BMIs, and a measure based upon 1985 height and 1988 weight. Height information was last collected in 1985. We examined the height data for inconsistencies and flagged 177 women and 240 men who appeared to "shrink" more than two inches in height between either the 1981 and 1982 interviews, or the 1981 or 1982 interview and the 1985 interview. For these individuals, we assigned heights based on a combination of the three reports.[11] In addition, if 1981 and 1982 heights were both missing, they

[11] Among those who appeared to lose more than two inches in height, we identify two types: those who lost more than two inches between 1982 and 1985 (Group A) and those who lost more than two inches between 1981 and 1982 (Group B). For Group A we imputed heights as follows. For

were set to the 1985 value.

Variables other than height or weight come from the 1988 interviews and hence represent values as of that year. Controls include actual work experience, highest grade completed as of 1988, age, region, SMSA, and black or Hispanic identification. (We conduct some analyses separately by race/Hispanic identification.) Most of these variables are standard and self-explanatory. Two require more explanation.

We use a measure of actual labor market experience based on reports of weeks worked each year after age 18. A good experience measure is important for a study of body mass and wages because, for example, if childbearing is associated with higher body mass it may lead higher body mass to be associated with lower wages through the effect of childbearing on the accumulation of labor market experience (e.g., Mincer and Polachek 1974; Filer 1993).

Our principal measure of economic status is the income-to-needs ratio in 1988, based on 1987 income (reported in the 1988 interview) and family composition as of the 1988 interview. It is defined as the family income of the respondent divided by the U.S. Census poverty line for the family based on its size and age composition (number of adults and children).[12]

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those who lost less than two inches from 1981 to 1985, height in 1981, 1982 and 1985 equals the average of the 1981 and 1985 heights. For those who lost less than two inches from 1981 to 1982, all three heights were set to the average of the 1981 and 1982 heights. Although everyone in Group A lost more than two inches in height from 1982 to 1985, if they grew at all between 1981 and 1985, then 1982 height was set to a weighted average of the 1981 and 1985 heights. For Group A individuals who lost more than two inches from 1981 to 1985, all three heights were set equal to the mean of the 1981 and 1982 heights.

Case B individuals were handled in the following manner. First, if they lost less than two inches or grew between 1982 and 1985, then we extrapolated linearly to impute the 1981 value. If they lost more than two inches between 1981 and 1982, then all three heights were set to the mean of the three of the reported height measures.

[12] We get similar results when we used family income as the dependent variable rather than the income/needs ratio.

Sample description

Table 1 presents a cross-tabulation of the distribution of the sample by BMI categories in 1982 and 1988. In 1988, at ages 23 to 31, about half sample women are in the recommended (19 to 23) BMI range, 29 percent are between 24 and 29, 13 percent had BMIs over 30, and 9 percent were below 19. Especially notable is the increase with age (between 1982 and 1988) in the fraction in the top two categories: the fraction above 30 rose from 5 to 13 percent, and the fraction above 23 rose from 24 to 42 percent. The substantial increase between 1982 and 1988 in the fraction of women in the overweight and obese categories highlights the need to investigate the possibility of endogeneity bias in estimated relations between BMI and economic status. In addition, only about 30 percent (201 out of 659) of women who were in the obese category at ages 23 to 31 were also in the obese category at ages 16 to 25.

There was a similar increase with age (i.e., between 1982 and 1988) in the fraction of men in the two heaviest BMI categories; the fraction with BMIs above 29 rose from 4 to 11 percent, and the fraction above 24 rose from 25 to 47 percent, a slightly greater increase than among women. The similar pattern of weight gain for men and women suggests that the increase for women was not entirely due to biological aspects of pregnancy and childbirth.[13] However, we explore this possibility below.

In Table 2a we present sample means and frequencies for women classified by BMI at ages 23 to 31 (1988). Family income, income/needs, spouse's earnings, hourly wages, years of schooling, and the fraction employed are lower in the higher BMI categories, while the fractions poor and minority are higher. Overweight and obese women are somewhat more likely to have children and less likely to be married. The fact that body weight is inversely associated with economic status in

[13] The distributions (not shown) by BMI in 1982 and 1988 for the subsample of persons who were single and childless in 1982 are remarkably similar to the those for the entire sample, despite the fact that only about half (53 percent) of the full sample of women are members of this subsample.

developed societies is well documented (Kannel, 1983). One goal of this study is to use sibling comparisons to determine whether this relationship reflects the influence of family background (e.g., social class) on weight, or whether there appears to be an association between weight and economic status in later life, net of family background differences.

Table 2b presents means for men by BMI category at age 23 to 31 (1988). The patterns for men differ from those for women. Income appears to be lowest among underweight men; differences across the other BMI categories are modest. Men in the lowest BMI category appear less likely to be married, more likely to be divorced or separated, and less likely to have children. A larger proportion are black. Spouse's earnings are slightly lower among obese men.

In Tables 3a and 3b we present means and frequencies in outcomes at ages 23 to 31 (1988) according to BMI category at ages 16 to 25 (1982) for women and men, respectively. The patterns are similar to those in the previous two tables, but the differentials for women by body mass are more dramatic. For example, the income differential between obese women and those in the 19 to 24 BMI category is about $11,000 in Table 3a, versus about $8,000 in Table 2a. Comparing these two BMI categories, the difference in the fraction poor in 1988 is 21 percentage points according to 1982 BMI versus 13 percentage points according to 1988 BMI.

RESULTS

Table 4 summarizes the results of multivariate models of income, marriage, spouse's earnings, and hourly wages for women and men. We estimated each model for the full sample (separate models by sex) using alternatively BMI at age 23 to 31 (1988) and the BMI at age 16 to 25 (1982). In addition, each model is estimated for the sub-sample of persons who were childless and single (never married) in 1982 using the 1982 BMI. The models also contain controls for age, years of schooling completed, and dummy variables for region (3), residence in an SMSA (2), and black

and Hispanic identification. In the wage models, we control for actual work experience instead of age.

Results for women

The figures in the table are coefficients of BMI categorical variables from least squares regressions, except for those under the heading "P(married)", which are derivatives based on logit coefficients, evaluated at the sample means. These derivatives may be interpreted as percentage point differences in the fraction married. The reference group for all models are persons in the "recommended" BMI range. Sibling differences are estimated by least squares for the three continuous outcomes[14], and fixed-effects logits (Chamberlain 1980) for the dichotomous outcome (marital status in 1988 = married). Because necessarily sample sizes are much smaller for sibling analyses, coefficient estimates are less precise.[15] We therefore look to the sibling analyses for general support for, or obvious contradiction of, evidence from cross-sectional analyses. Cross-sectional estimates have the advantage of being based on larger samples, but may suffer from bias induced by unmeasured family background differences.

In the first panel of the table we present differentials in outcomes at ages 23 to 31 (1988) according to BMI category at ages 16 to 25 (1982). The cross-sectional models provide evidence that women who were obese or overweight at ages 16 to 25, have, at ages 23 to 31, lower family income, lower hourly wages (30+ category only), are less likely to be married, and have lower spousal income (if married) than women in the recommended BMI range. The pattern of coefficients from

[14]Sibling differences are computed as differences from within-family means. This procedure is equivalent to entering a dummy variable for each family of origin (e.g, Greene, 1993, pp. 466-469). One differenced observation per family is dropped.

[15] For fixed-effects logits, sister pairs contribute to the likelihood function only if sisters differ with respect to the outcome (i.e., one is married in 1988 and one is not).

the sibling analysis is similar, suggesting that family background heterogeneity bias is not serious in cross-sectional estimates.

In the second panel we present differentials in outcomes at age 23 to 31 (1988) according to BMI category at ages 23 to 31. Differentials by BMI category in family income, spouses earnings, and wages are similar to but smaller (in absolute value) than those in the first panel. There is no evidence of lower probabilities of marriage among heavier women in the second panel.

What does the comparison between the first two panels tell us? First, differences in income, marriage, spousal income, and wages by BMI category in the second panel (age 23 to 31 BMI, age 23 to 31 outcomes) do not appear to be, on net, biased downward (i.e., are not made "too negative") by endogenous or simultaneous determination of age 23 to 31 BMI. If anything, they appear to be biased upward. Second, the fact that heavier women are no less likely to be married according to the second panel but *are* less likely to be married according to the first panel suggests that the source of upward bias in the second panel may be that marriage (or perhaps childbearing) raises weight. However, as we shall see later, controlling for marital status, the presence of children, and the age of the youngest child has no effect on the estimated wage differentials, and only a modest effect on the income differentials by BMI.

In the third panel of the table we present differentials in outcomes at age 23 to 31 (1988) according to BMI at age 16 to 25 (1982) for the subsample of women who were single (never married), childless, and not pregnant in 1982. Results are similar to those in the first panel, but the differentials across BMI categories are larger (in absolute value). Differences in the two marriage market outcomes are especially dramatic.

Results for men

Results for men are presented in the bottom panel of Table 4. Significant results in the first

panel include lower income, lower marriage probabilities, and lower spouses earnings among underweight men. Obese men have lower wages. When we relate outcomes at ages 23 to 31 to BMI at the same age (second panel), we find that heavier men are more likely to be married, and, compared to results in the first panel, underweight men's income is relatively lower. As with the results for women, the comparison of the first and second panels suggests, if anything, that differentials in outcomes at ages 23 to 31 between obese or overweight men and men in the recommended weight range according to age 23 to 31 BMI category are biased upward by endogenous determination of BMI, possibly the result of weight gain associated with marriage.

Accounting for income differences

How much of the difference in income between obese women or underweight men and their counterparts in the recommended BMI ranges is accounted for by labor market differences (wages and employment), and how much by marriage market differences (probability of being married and spouse's earnings if married)? The answer to this question depends somewhat on the sample (e.g., full sample or single/childless only) and the age at which the BMI is measured. The following figures are based on BMIs at ages 16 to 25 (1982), the full samples of men and women, and have been adjusted for race, education, age, region, and urban residence.

BMI at Ages 16 to 25 (1982)

Outcomes at Ages 23 to 31	Women 19-23 BMI Minus 30+ BMI ($)	(%)	Men 20-24 BMI Minus < 20 BMI ($)	(%)
Labor Market	1050	17.0	3373	85.2
Marriage Market	4957	80.4	1426	36.0
Other	162	2.6	-839	-21.2
Total Adjusted Income Difference	6169	100.0	3960	100.0

The figures in this table make evident that the vast majority (80 percent) of the difference in family income between obese women and those in the recommended weight range results from differences in the marriage market (lower fraction married and lower spouses earnings if married), compared to about 17 percent from the labor market. Using the age 23 to 31 (1988) BMI measure raises the proportion of the obesity differential in adjusted income accounted for by labor market differences to about one third, and lowers the proportion due to marriage market outcomes to about fifty percent. On the other hand, restricting the sample to women who were single and childless at ages 16 to 25 raises the proportion of the obesity differential that is accounted for by marriage market differences to 96 percent ($7014 out of $7332); labor market differences account for 12 percent in this subsample. (The figures sum to more than 100 percent because obese women have slightly higher unearned family income.) In sum, although obese women appear to be disadvantaged in the labor market, marriage market differences account for the great majority their substantial deficits in economic status.

Race differences

There is a literature that suggests that there are cultural differences in norms pertaining to ideal body type (e.g., Furnham and Alibhai, 1983). In particular, there may be a smaller social penalty attached to being overweight for African American than white women. Consistent with this hypothesis, black women are more likely to be above "ideal" body weight, but they are less likely to perceive themselves to be overweight (Dawson, 1988).

This literature suggests several testable hypotheses. The most obvious is that if social pressure is an important determinant of weight, the prevalence of overweight should be higher among African Americans than among whites, especially for women. The figures in Tables 2 and 3 confirm for our sample that this is indeed the case. Second, since marriage markets continue to be highly segmented by race, especially for black women (Kalmijn 1993), we would expect these social norms to be reflected in marriage probabilities, so that a given weight differential should be associated with larger differences in marriage probabilities for whites than blacks.

Finally, one might also predict that the difference in hourly wages between obese and recommended-weight black women should be smaller (in absolute value) than the corresponding difference among white women. This prediction requires more explanation than the other two. If discrimination is purely weight-based, and black and white women work for the same employers, then there would be no reason to predict a race difference in the BMI-based pay differentials. However, black women may tend to work disproportionately for black employers or under black supervisors, and will, by definition, work disproportionately for employers who hire many black women; thus, social norms in their places of employment may tend to conform to African American social norms. If black women experience racially-based employment discrimination they will, on average, work for employers who engage in a less-than-average amount of race discrimination. It seems plausible to us that employers who engage in less racial discrimination in hiring may also be less likely to engage in

other forms of discrimination. Thus, we would predict a smaller wage penalty for obese black women compared to their white counterparts. A final possibility worth mentioning, albeit a more speculative one, is that marriage-market considerations may influence labor market outcomes due to the social nature of the workplace. Since marriage markets tend to be segmented by race, white male employers may give social factors less importance in making hiring or promotion decisions about black women as compared to white women. In particular, they may be less likely to pay a "thinness premium" to black women.

In Tables 5a and 5b we repeat the analyses of Table 4 for subsamples of Hispanic, non-Hispanic black and non-Hispanic white women. Figures in Table 5a are cross-sectional differences in income, marriage, hourly wages and spouse's earnings for the full sample according to categories of BMI at ages 16 to 25 (1982) or 23 to 31 (1988). Figures in Table 5b pertain to the subsample of people who were single and childless at ages 16 to 25. Sibling sample sizes were too small to permit separate analyses of sibling differences by race/Hispanicity.

We find smaller differences by body mass for African American women than for white women. For example, regression-adjusted differences in the log of family income/needs at ages 23 to 31 (1988) between women who were in the 30+ BMI range and those in the 19-24 (reference) range were -0.42 for whites, -0.23 for Hispanics, and -0.04 for blacks. The lower penalty among overweight black women is also apparent in models of marriage and hourly pay. However, difference across BMI categories in spouse's earnings (conditional on marriage) are not smaller among African Americans than among whites or Hispanics.

In order to determine whether the substantial race differences that appear in these tables are statistically significant, we reran the models presented in the first panel of Table 4 for women and introduced an interaction term between obesity and black racial identification. The coefficient of this interaction term in the income/needs equation was (positive) 0.30, and was significant at the .01 level.

The coefficient of the obesity coefficient itself was -.38 ($p < .01$), about the size of the corresponding coefficients for white and Hispanic women presented in the first panel of Table 5a. The corresponding wage equation coefficients exhibited the same pattern: the coefficient of the black * obese interaction was 0.16 ($p < .05$).

In fact, since the coefficient of the black variable itself was -0.04, obese black women earned on average about 12 percent more per hour than obese white women (although this difference is not quite statistically significant; $p = .12$), controlling for labor market experience, education, and so forth.

Results for men in the bottom panel of Table 5a suggest an obesity wage penalty for white men (last two columns) only, using either the contemporaneous or the earlier BMI measure. Family income deficits among underweight men appear for all three groups.

Detailed wage and income models

In Tables 6a-6c we present more detailed analyses of wage differences. In the first row of each panel we present (for convenience) the results reported in the corresponding column of Table 4. In the second row we add to the variables included in the first specification: dummy variables for married and divorced/separated in 1988, a dummy variable for the presence of children in 1988, and an interaction of this variable with the age of the youngest child. The purpose of these models is to test whether wage differentials across the BMI categories reflect the effects of marriage and children. In the third row of each panel, we add seven occupation dummy variables corresponding to the categories that appear at the bottom of Table 2. All in all, the figures in Table 6a indicate that adding controls for marital status, children and occupation has little effect on the wage differentials by body mass for women. In all cases, differentials are similar to those found in the least detailed models (1), and appear somewhat larger than those reported by Register and Williams (1990).

Table 6b presents the corresponding analyses for men. Again, adding controls for 1988

marital status, children and occupation has little effect on the wage differentials by body mass. The same is true for the subsample of persons who were single and childless in 1982 (Table 6c).

Systematic differences in pay linked to a personal characteristic which remain after human capital differences have been accounted for are often interpreted as evidence of pay discrimination. In this sense, the wage equation estimates provide evidence of pay discrimination against obese women. Such pay differentials may also reflect unmeasured productivity differences correlated with body mass. However, the hypothesis that these pay differentials result from labor market discrimination is supported by reports by obese or overweight women that they are subjected to labor market discrimination because of their weight (e.g., Coleman 1993; Kolata et al., 1992). Another piece of evidence in support of the discrimination hypothesis comes from responses to a question about experience with sex-based discrimination asked most recently in the 1983 wave of the NLSY: "Have you ever experienced discrimination at work?...Was that on the basis of sex?" The proportion of women who responded "yes" to the *sex* discrimination question varied by 1982 BMI category: 10.3, 10.8, 10.8 and 17.1 percent among women in the < 19, 19 to 23, 24 to 29, and 30+ BMI categories, respectively. (No questions were asked about weight-based discrimination.)

In Tables 7a-7c we present detailed models of family income by body mass. As in Table 6a-6c, in Tables 7a-7c we gauge the sensitivity of BMI effects to the addition of control variables to the basic specification. We estimate this set of models to address the possibility (noted in our discussion of Table 4) that the contemporaneous associations (i.e., at ages 23 to 31) may biased upward by endogenous determination of weight. In particular, our results led us to speculate that marriage (or child bearing) may be associated with weight gain between, and with higher income at age 23 to 31. If marriage and children are an important source of omitted variable bias (or important mediating factors), then controlling for marital status, the presence of children, and the age of the youngest child at ages 23 to 31 should: 1. reduce the differentials at ages 23 to 31 (1988) in income by body mass;

and 2. reduce differences between the results based on earlier and later BMI measures.

Controlling for marital status, the presence of children, and age of the youngest child has surprisingly little effect on the cross-sectional differences in income for the heaviest women (compare rows (1) and (2) in either panel a). These controls have larger effects on sibling differences (panel b), so it is difficult to reach definitive conclusion regarding the importance of marital status in explaining income differences by BMI.

For men (Table 7b), controlling for marital status, presence of children, age of youngest children, has relatively little effect on income differentials by body mass. Results for the subsample of women and men who were single and childless in 1982 are similar (see Table 7c).

Alternative hypotheses

One hypothesis regarding the source of economic differences by BMI is that they reflect differences in health status. Both underweight and obesity are associated with health problems; in fact, these categories are defined by their associations with health risks. Although health differences could explain the lower earnings of underweight men and obese women, it is not obvious why a gender difference should exist (i.e., the hypothesis that the relationship between economic status and BMI is confounded by unmeasured health status would predict that underweight women and obese men should also suffer economically).

We explored the possibility that relationships between BMI and economic status are confounded by unmeasured health status by including in the wage and income models an indicator of health status based on three questions in the 1988 NLSY (the survey year that the income and wage measures we use were collected). We created a dummy variable equal to one if the respondent reported that health limited ability to work or amount or type of work; and zero otherwise. Table 8 presents cross-tabulations of this indicator of 1988 health limitations according to BMI category in

1982 and 1988 for men and women. The prevalence of health limitations is related to obesity and underweight in the expected manner. Women who were above or below recommended weight for height in 1988 were 50 to 130 percent more likely to report health limitations than women in the recommended range. Men in the <20 and 30+ ranges were about twice as likely to report a health limitation as those in the recommended range. However, adding the health limitations indicator to the wage and income regressions had no effect on the size or statistical significance of the coefficients of BMI categories in any of the wage or income models summarized in the above tables.[16] The absence of a change in the BMI coefficients in the income equation was especially notable given that the coefficient of the health limitations variable itself was statistically significant and very large in all the cross-sectional income equations (the coefficient in the log income equations was in the -0.20 to -0.40 range).

A second hypothesis we considered is whether measures of self-esteem were likely to account for economic differences by body mass.[17] In Tables 9a and 9b we present cross-tabulated responses to 10 statements related to self-esteem for women and men. The statements were read in two different interviews: in 1980, when sample members were aged 15 to 23, and in 1987, when sample members were aged 22 to 30. The figures in the tables represent the fraction who agreed or agreed somewhat to the self-esteem statements in 1980 according to BMI categories in 1982, and responses to 1987 statements according to BMI categories in 1988 (in italic typeface). There are several

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[16]More specifically, when we added the health limitations dummy variable, nearly all the coefficients of the BMI categories were within .01 of their previous values, no coefficient changed in size by more than .02, and no statistical inference was affected.

[17] One version of this hypothesis holds that obesity effects are confounded by unmeasured self-esteem, amounting to a suggestion that heavier persons earn lower wages due to low self-esteem and not weight *per se*. However, self-esteem may be affected by social treatment. Another version of they hypothesis holds that the differential economic status of obese persons is accounted for by low self-esteem, but views low self-esteem to be primarily the result of obesity (e.g., see Gortmaker et al., who find no effects of obesity on an index of self-esteem).

noteworthy patterns.

First, there is a marked increase with age in self-esteem within all BMI categories. Second, the fraction who agree or strongly agree with the self-esteem statement which is most directly related to labor market productivity ("4. I am able to do things as well as most other people") exhibits no variation by BMI category, and in fact is uniformly high. Responses to some other statements are suggestive of lower self-esteem among obese women, but the differences seem modest. This pattern is consistent with Gortmaker et al.'s finding no effect of obesity on an index of self esteem.

SUMMARY AND DISCUSSION

We have presented a range of evidence about the association between obesity and economic status for men and women. There are substantial deficits in family income at ages 23 to 31 among obese women compared to women with BMIs in the recommended range. We took advantage of the longitudinal nature of the data to argue that social and economic differentials are most likely not the result of adverse labor or marriage market outcomes causing weight gain. In particular, using an earlier weight measure strengthens the adverse association between obesity and economic status. In general, we find similar results when we compare same-sex siblings as a way to control for family background (e.g., social class) differences. In the remainder of this paper, we discuss our results in light of the recommendation (e.g., by Gortmaker et al.) that consideration be given to extending the Americans With Disabilities Act (AWDA) to obese persons.

First, there is evidence of considerable cross-group variation in economic differentials related to obesity. In our sample, only white women who were obese both at ages 16 to 24 and at ages 23 to 31 experienced a substantial wage penalty (around 20 percent). At ages 23 to 31, obese men and obese African American women do not have substantially and statistically significantly lower wages than their counterparts in the recommended BMI range. In addition, women who entered the obese

category between ages 16 to 24 and 23 to 31 have wages that are only about six percent below those of women of recommended weight (although this difference is statistically significant). Because the prevalence of obesity increases markedly over this range of ages, only about 30 percent of women in our sample who were obese at ages 23 to 31 were also obese at the younger ages. These results suggest that extending the AWDA to obese persons may not be "target efficient" in that the majority of persons who would be affected by a change in the law do not appear to be in need of the protection it may provide.

Second, and most importantly, our results indicate that extending the AWDA to cover obesity may not be an effective way to raise the income of obese women. The great majority (as much as 96 percent) of the economic deficit associated with obesity among women in our sample results from differences in the marriage market (lower probabilities of marriage and lower spousal income), not the labor market.

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Table 1a: Distributions of 1988 Body Mass Index by 1982 Body Mass Index, Full Sample

	1988 BMI					
WOMEN						
	<19	19-23	24-29	30+	All	N
1982 BMI						
<19	39.4	54.6	5.9	0.1	14.1	711
19-23	5.0	62.0	29.5	3.5	62.2	3139
24-29	0.3	13.5	49.9	36.3	19.1	962
30+	0.4	3.8	10.6	85.2	4.7	236
All	**8.8**	**49.0**	**29.2**	**13.1**	100.0	
N	442	2473	1474	659		5048
MEN						
	<20	20-24	25-29	30+	All	N
1982 BMI						
<20	31.2	62.5	5.7	0.6	10.3	506
20-24	1.9	60.3	34.9	2.9	65.1	3196
25-29	0.2	11.7	60.1	28.0	20.4	1003
30+	0.0	3.4	13.2	83.4	4.2	205
All	**4.5**	**48.2**	**36.1**	**11.1**	100.0	
N	222	2367	1774	547		4910

Table 1b: Distributions of 1988 Body Mass Index by 1982 Body Mass Index, Persons Who Were Unmarried, Childless, and Not Pregnant in 1982

	1988 BMI					
WOMEN						
1982 BMI	<19	19-23	24-29	30+	All	N
<19	36.0	57.6	6.4	0.0	15.3	408
19-23	4.7	63.3	28.4	3.6	64.2	1710
24-29	0.5	12.0	49.4	38.1	16.3	433
30+	0.9	3.6	6.3	89.3	4.2	112
All	**8.7**	**51.6**	**27.5**	**12.2**	100.0	
N	231	1373	733	326		2663
MEN						
1982 BMI	<20	20-24	25-29	30+	All	N
<20	30.8	63.0	5.4	0.7	11.3	441
20-24	1.9	60.1	34.8	3.3	66.3	2597
25-29	0.3	11.6	57.7	30.5	18.3	716
30+	0.0	3.7	13.0	83.2	4.1	161
All	**4.8**	**49.3**	**34.8**	**11.2**	100.0	
N	186	1928	1361	440		3915

Table 2a: 1988 Sample Means and Frequencies by Body Mass Index in 1988, Women

(percents unless indicated)

		Body Mass Index in 1988			
	All	<19	19-24	25-29	30+
Family Income ($)	26,387	29,361	28,683	24,182	20,435
Income/needs	2.9	3.2	3.2	2.5	2.1
Poor	20.5	19.6	16.9	22.6	30.7
Income missing	17.0	15.8	16.3	17.8	18.8
Married	51.7	53.6	51.6	53.1	47.6
Divorced/Sep.	5.5	5.4	4.4	6.8	6.8
Schooling (yrs.)	12.8	12.8	13.1	12.6	12.1
Age (yrs.)	26.7	26.4	26.6	26.8	26.8
Any kids?	61.5	57.2	56.7	68.3	66.8
Any * age youngest	2.1	1.9	1.9	2.3	2.5
Black	25.9	14.9	20.9	30.6	41.0
Hispanic	15.6	10.2	14.2	19.5	16.1
BMI, 1988	24.4	18.0	21.4	26.4	35.0
BMI, 1982	22.3	18.8	20.8	23.3	28.4
Employed	79.2	78.1	82.1	77.7	72.1
Hourly wage ($)[1]	7.52	7.51	8.03	7.06	6.44
Actual exper. (yrs.)[1]	6.1	5.9	6.4	5.9	5.4
Occupation[1]					
Mang./Prof.	19.6	21.7	15.9	21.7	27.3
Sales	21.6	24.2	25.2	18.2	13.8
Clerical	9.4	10.4	9.6	9.4	7.6
Service	22.7	21.3	23.2	23.5	20.2
Manf., unskilled	16.5	12.9	16.7	16.0	19.4
Manf., skilled	8.2	7.7	7.3	9.3	9.7
Other	2.0	1.8	2.1	1.8	2.0
Spouse's earnings[2]	23,482	26,241	25,439	21,464	18,050
Unmar. & no kids '82	52.8	52.3	55.5	49.7	49.5
Sample size	5048	442	2473	1474	659

1. If employed
2. Annual earnings of spouse, if sample person is married and spouse employed.

Table 2b: 1988 Sample Means and Frequencies by Body Mass Index in 1988, Men

(percents unless indicated)

		Body Mass Index in 1988			
	All	<20	20-24	25-29	30+
Family Income ($)	27,997	21,517	27,516	29,653	27,064
Income/needs	3.2	2.4	3.3	3.3	3.0
Poor	11.1	19.5	12.5	7.7	12.9
Income missing	21.4	28.4	21.0	20.9	22.3
Married	44.2	34.7	40.2	49.2	49.4
Divorced/Sep.	4.1	6.8	4.5	3.7	2.4
Schooling (yrs.)	12.6	12.0	12.8	12.6	12.2
Age (yrs.)	26.5	26.1	26.4	26.6	26.8
Any kids?	35.1	29.7	31.5	38.9	40.4
Any * age youngest	0.9	0.8	0.7	1.1	1.0
Black	26.8	32.0	27.7	25.8	24.1
Hispanic	16.3	13.1	13.1	18.8	22.9
BMI, 1988	25.3	19.0	22.9	26.9	33.4
BMI, 1982	23.4	19.5	21.9	24.3	28.5
Employed	87.9	82.0	87.6	88.0	91.2
Hourly wage ($)[1]	9.37	7.74	9.37	9.74	8.81
Actual exper. (yrs.)[1]	7.0	6.1	6.9	7.1	7.5
Occupation[1]					
Mang./Prof.	13.5	17.6	12.8	14.2	12.6
Sales	18.3	13.5	19.9	18.0	14.3
Clerical	6.5	6.3	6.7	6.5	6.0
Service	7.6	6.3	7.9	7.6	6.8
Manf., unskilled	10.6	11.7	10.0	10.7	13.0
Manf., skilled	24.4	25.7	23.6	23.8	29.8
Other	19.0	18.9	19.1	19.2	17.6
Spouse's earnings[2]	12,538	12,145	12,773	12,664	11,432
Unmar. & no kids '82	79.7	83.8	81.5	76.7	80.4
Sample size	4910	222	2367	1774	547

1. If employed
2. Annual earnings of spouse, if sample person is married and spouse employed.

Table 3a: 1988 Sample Means and Frequencies by Body Mass Index in 1982, Women

(percents unless indicated)

		Body Mass Index in 1982			
	All	<19	19-24	25-29	30+
Family Income ($)	26,387	29,423	27,747	21,829	16,978
Income/needs	2.9	3.2	3.0	2.2	1.8
Poor	20.5	15.2	18.6	26.4	39.3
Income missing	17.0	14.9	16.9	19.2	16.9
Married	51.7	55.6	53.5	47.3	34.7
Divorced/Sep.	5.5	4.5	5.0	6.9	9.7
Schooling (yrs.)	12.8	13.0	12.9	12.3	11.8
Age (yrs.)	26.7	26.2	26.6	26.9	27.3
Any kids?	61.5	56.5	61.1	67.0	57.6
Any * age youngest	2.1	1.8	2.0	2.5	2.6
Black	25.9	15.2	24.6	33.2	44.9
Hispanic	15.6	12.9	15.1	20.5	11.0
BMI, 1988	24.4	19.8	23.1	28.9	36.3
BMI, 1982	22.3	18.1	21.3	26.2	34.0
Employed	79.2	79.5	80.4	76.7	72.0
Hourly wage ($)[1]	7.52	7.56	7.77	6.99	5.84
Actual exper. (yrs.)[1]	6.1	6.1	6.3	5.7	5.3
Occupation[1]					
Mang./Prof.	19.6	19.1	18.3	21.6	30.1
Sales	21.6	25.6	22.8	17.3	11.0
Clerical	9.4	9.1	9.7	9.0	7.2
Service	22.7	21.7	23.5	21.9	18.2
Manf., unskilled	16.5	15.0	15.9	18.4	21.2
Manf., skilled	8.2	7.9	7.6	10.0	10.2
Other	2.0	1.5	2.1	1.8	2.1
Spouse's earnings[2]	23,482	26,314	24,171	19,331	16,776
Unmar. & no kids '82	52.8	57.4	54.5	45.0	47.5
Sample size	5048	711	3139	962	236

1. If employed
2. Annual earnings of spouse, if sample person is married and spouse employed.

Table 3b: 1988 Sample Means and Frequencies by Body Mass Index in 1982, Men

(percents unless indicated)

		Body Mass Index in 1982			
	All	<20	20-24	25-29	30+
Family Income ($)	27,997	23,638	28,128	29,766	27,267
Income/needs	3.2	2.7	3.3	3.3	3.1
Poor	11.1	14.8	11.1	9.0	12.3
Income missing	21.4	25.3	21.2	19.4	24.4
Married	44.2	36.8	43.7	49.8	43.9
Divorced/Sep.	4.1	5.9	4.0	4.0	2.0
Schooling (yrs.)	12.6	12.4	12.7	12.6	12.5
Age (yrs.)	26.5	25.5	26.5	27.0	27.2
Any kids?	35.1	31.0	34.0	41.1	32.7
Any * age youngest	0.9	0.7	0.8	1.2	0.9
Black	26.8	25.7	28.8	22.4	20.5
Hispanic	16.3	13.4	15.3	18.8	25.4
BMI, 1988	25.3	21.3	24.4	28.4	34.5
BMI, 1982	23.4	19.0	22.4	26.8	33.0
Employed	87.9	82.6	88.0	89.5	91.2
Hourly wage ($)[1]	9.37	8.23	9.50	9.59	8.93
Actual exper. (yrs.)[1]	7.0	6.2	6.9	7.5	7.8
Occupation[1]					
Mang./Prof.	13.5	16.0	13.2	13.8	10.7
Sales	18.3	15.8	19.2	16.8	17.6
Clerical	6.5	5.5	6.7	6.6	6.8
Service	7.6	8.1	7.7	7.2	7.3
Manf., unskilled	10.6	10.1	10.6	11.3	9.8
Manf., skilled	24.4	22.3	24.3	24.8	29.3
Other	19.0	22.1	18.3	19.5	18.5
Spouse's earnings[2]	12,538	11,535	12,751	12,580	11,068
Unmar. & no kids '82	79.7	87.2	81.3	71.4	78.5
Sample size	4910	506	3196	1003	205

1. If employed
2. Annual earnings of spouse, if sample person is married and spouse employed.

Table 4: Regression-Adjusted Differences in Marriage and Labor Market Outcomes in 1988 According to BMI Category in 1988 or 1981-82

	Percent or Precentage Point Differences							
	Income/Needs[1]		Pr(Married)[2]		Spouse's Earnings[3]		Hourly Wage[4]	
	XSEC	SIB DIFFS	XSEC	SIB DIFFS	XSEC	SIB DIFFS	XSEC	SIB DIFFS
WOMEN								
Full Sample 1982 BMI								
30+	-.25*	-.33*	-.19*	-.23*	-.23*	-.25	-.15*	-.12
24-29	-.14*	-.12	-.05*	-.10*	-17*	.03	-.01	-.03
<19	.03	.02	.01	.02	.09*	.14	-.00	-.07
N	4188	609	5048	299	2137	198	3996	593
Full Sample 1988 BMI								
30+	-.13*	-.11	.00	-.01	-.24*	-.12	-.09*	-.07
24-29	-.10*	-.04	.04*	.04	-.11*	-.07	-.06*	-.02
<19	-.04	.20#	-.00	-.08	.02	.36*	-.04	.05
N	4188	609	5048	299	2137	198	3996	593
Single & Childless in 1982, 1982 BMI								
30+	-.33*	-.27	-.31*	-.71*	-.42*	-1.06	-.24*	-.15
24-29	-.15*	-.01	-.10*	-.17#	-.21*	.09	-.03	.04
<19	.03	.08	.01	-.19#	.17*	.14	.00	-.10
N	2189	256	2663	146	1030	79	2559	288
MEN								
Full Sample 1982 BMI								
30+	-.14	-.22	-.04	-.14	-.09	-.10	-.08*	-.09*
25-29	.05	-.03	.02	-.02	.06	.02	-.01	-.04
<20	-.14*	-.04	-.04#	.02	-.20*	-.32	-.09	-.03
N	3589	615	4910	356	1493	105	4317	781
Full Sample 1988 BMI								
30+	.02	-.28*	.08*	.06	.00	-.37	-.04*	-.05
25-29	.13*	.06	.09*	.09#	.14*	.17	.03*	.03
<20	-.22*	.17	-.04	.03	.13	.33	-.09*	.00
N	3859	615	4910	356	1493	105	4317	781
Single & Childless in 1982, 1982 BMI								
30+	-.02	-.31	-.07#	-.15	.00	-.37	-.06	-.13
25-29	.06	-.09	-.00	-.02	.06	-.11	-.02	-.08#
<20	-.17*	.03	-.01	-.00	-.19#	-.35	-.09*	-.02
N	3015	430	3915	264	1054	60	3442	570

Notes: Detailed notes follow Table 5b.

* $p < .05$; # $.05 < p < .10$

N is the number of observations, or (approximately) the number of pairs for same-sex sibling differences. See text for details.

Table 5a: Regression-Adjusted Differences in Marriage and Labor Market Outcomes in 1988 According to BMI Category in 1988 or 1981-82, By Race

Percent or Percentage Point Differences

	Income/Needs[1]		Pr(Married)[2]		Spouse's Earnings[3]		Hourly Wage[4]	
	1982 BMI	1988 BMI	1982 BMI	1988 BMI	1982 BMI	1988 BMI	1982 BMI	1988 BMI
WOMEN								
Hispanics								
30+	-.23	-.14	-.22*	.00	-.05	-.29*	-.19#	-.09
24-29	-.14#	-.06	-.00	.06	-10	-.03	-.02	-.04
<19	.10	.04	.03	-.04	.27#	.11	.03	.14#
N	634	634	798	798	345	345	593	593
Blacks								
30+	-.04	-.10	-.05	.02	-.26	-.35*	-.08	-.05
24-29	-.12#	-.04	-.01	.04	-.31*	-.08	-.01	-.02
<19	.06	-.09	.07	.06	-.10	-.10	-.07	-.09
N	1021	1021	1305	1305	281	281	1000	1000
Whites								
30+	-.42*	-.13*	- 25*	.01	-.29*	-.18*	-.21*	-.12*
24-29	-.13*	-.14*	-.08*	.04	-.15*	-.14*	-.00	-.08*
<19	.01	-.05	-.02	-.01	.09#	.02	.00	-.05#
N	2533	2533	2978	2978	1511	1511	2403	2403
MEN								
Hispanics								
30+	-.11	-.06	-.00	.07	-.28	-.04	-.11	-.04
25-29	-.08	-.15*	-.01	.08*	-.12	.07	-.04	.02
<20	-.20	-.69*	-.04	-.05	.19	-.02	-.07	-.01
N	584	584	807	807	211	211	719	719
Blacks								
30+	-.00	.06	-.13	.04	.29	-.04	.04	.06
25-29	.06	.10#	.03	.07*	-.32*	.18	.01	.04
<20	-.18#	-.18	-.03	-.02	-.10	.27	-.09*	-.09
N	931	931	1320	1320	275	275	1081	1081
Whites								
30+	-.05	-.01	-.03	.10*	-.08	-.02	-.12*	-.09*
25-29	.07#	.13*	.02	.09*	.15*	.13*	-.01	.03
<20	-.13*	-.17*	-.05	-.04	-.29*	.07	-.10*	-.11*
N	2344	2344	2824	2824	1017	1017	2517	2517

Detailed notes follow Table 5b.

* $p < .05$; # $.05 < p < .10$

N is the number of observations.

Table 5b: Regression-Adjusted Differences in Marriage and Labor Market Outcomes in 1988 According to BMI Category in 1982, By Race, Subsample of Persons who were Single and Childless in 1982

Percent or Percentage Point Differences

	Income/Needs[1]		Pr(Married)[2]		Spouse's Earnings[3]		Hourly Wage[4]	
	Women	Men	Women	Men	Women	Men	Women	Men
Hispanics								
30+	-.03	-.08	-.13	-.06	.33	-.18	-.37*	-.12
24-29	-.10	-.08	-.01	-.07	-.28#	-.00	-.02	-.04
<19	.32	-.15	.09	-.06	.35#	.30	.09	.11
N	322	430	400	609	162	138	332	551
Blacks								
30+	-.15	-.00	-.12	-.06	-.46	.29	-.15*	.05
24-29	-.11	.07	-.01	.01	-.30#	-.26	-.04	.00
<19	-.00	-.23*	.05	- .06	-.16	-.18	-.06	-.11*
N	480	798	639	1147	128	209	517	950
Whites								
30+	-.51*	-.04	- 44*	-.08	-.60*	-.04	-.28*	-.08
24-29	-.14	.07	-.16*	.00	-.16*	.11	-.04	-.03
<19	-.03	-.15*	-.02	-.05	.17*	-.28*	-.00	-.09*
N	1386	1787	1624	2159	740	707	1410	1941

Detailed notes follow Table 5b.

* $p < .05$; # $.05 < p < .10$

N is the number of observations.

Notes to Tables 4, 5a and 5b.

1. Dependent variable = ln(income/needs) in 1987, where needs are defined as the poverty line for the family unit. Regression controls include in addition to dummy variables for BMI category: age, years of schooling and dummy variables for region (3), racial/Hispanic identification (2), and residence in an SMSA (2).

2. Dependent variable is dichotomous: "married in 1988." Controls entered in the logit models include in addition to dummy variables for BMI category: age, years of schooling and dummy variables for region (3), racial/Hispanic identification (2), and residence in an SMSA (2). Numbers shown are derivatives evaluated at the sample mean and may be interpreted as percentage point differences in the probability of being married in 1988. Sibling differences are from fixed-effects logits models.

3. Dependent variable = ln(spouse's annual earnings) in 1987. The sample consists of sample members who are married and whose spouses earned at least 100 dollars in 1987. Regression controls include in addition to dummy variables for BMI category: age, years of schooling and dummy variables for region (3), racial/Hispanic identification (2), and residence in an SMSA (2).

4. Dependent variable = ln(sample member's hourly wage in survey week). The sample consists of sample members who worked for pay during the survey week. Regression controls include in addition to dummy variables for BMI category: actual labor market experience, years of schooling and dummy variables for region (3), racial/Hispanic identification (2), and residence in an SMSA (2).

Table 6a: Regression-Adjusted Differences in Hourly Wage Rates by 1988 and 1982 BMI, Women.
Dependent variable = ln(hourly wage in 1988)

	OLS Coefficients (SEs)		
	Body Mass Index		
	<19	24-29	30+
1988 BMI			
a. Cross section (N=3996)			
(1)	-.04 (.03)	-.06* (.02)	-.09* (.02)
(2)	-.04# (.03)	-.06* (.02)	-.09* (.02)
(3)	-.05* (.02)	-.06* (.02)	-.09* (.02)
b. Sister diffs. (n=593)			
(1)	.05 (.07)	-.02 (.04)	-.07 (.08)
(2)	.05 (.07)	-.02 (.04)	-.07 (.08)
(3)	.04 (.07)	-.02 (.04)	-.07 (.07)
1982 BMI			
a. Cross section (N=3996)			
(1)	-.00 (.02)	-.01 (.02)	-.15* (.03)
(2)	-.00 (.02)	-.01 (.02)	-.16* (.03)
(3)	-.01 (.02)	-.01 (.02)	-.14* (.03)
b. Sister diffs. (N=593)			
(1)	-.07 (.06)	-.03 (.05)	-.12 (.12)
(2)	-.07 (.06)	-.04 (.05)	-.14 (.12)
(3)	-.09# (.06)	-.03 (.05)	-.11 (.12)

* $p<.05$; # $.05<p<.10$

(1) Controls include years of education, actual labor market experience, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988 and dummy variables for "any children" and an interaction of "any children" and age of the youngest child.

(3) Controls in (2) plus seven occupation dummy variables. See text for details.

Table 6b: Regression-Adjusted Differences in Hourly Wage Rates by 1988 and 1982 BMI, Men.
Dependent variable = ln(hourly wage in 1988)

	OLS Coefficients (SEs)		
	Body Mass Index		
	<20	25-29	30+
1988 BMI			
a. Cross section (N=4317)			
(1)	-.09 (.03)	.03* (.02)	-.04* (.02)
(2)	-.09* (.03)	.03♯ (.02)	-.05* (.02)
(3)	-.08* (.03)	.03* (.01)	-.03 (.02)
b. Brother diffs. (n=781)			
(1)	.00 (.07)	.03 (.03)	-.05 (.05)
(2)	.00 (.07)	.02 (.03)	-.05 (.05)
(3)	.00 (.06)	.03 (.03)	-.03 (.05)
1982 BMI			
a. Cross section (N=4317)			
(1)	-.09* (.02)	-.01 (.02)	-.08* (.03)
(2)	-.09* (.02)	-.02 (.02)	-.08* (.03)
(3)	-.09* (.02)	-.01 (.02)	-.07* (.03)
b. Brother diffs. (N=781)			
(1)	-.03 (.05)	-.04 (.04)	-.09 (.07)
(2)	-.03 (.05)	-.04 (.04)	-.08 (.07)
(3)	-.03 (.05)	-.04 (.04)	-.07 (.07)

* $p<.05$; ♯ $.05<p<.10$

(1) Controls include years of education, actual labor market experience, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988 and dummy variables for "any children" and an interaction of "any children" with age of youngest child.

(3) Controls in (2) plus seven occupation dummy variables. See text for details.

Table 6c: Regression-Adjusted Differences in Hourly Wage Rates by 1988 and 1982 BMI, Persons Who Were Unmarried and Childless in 1982.
Dependent variable = ln(hourly wage in 1988)

	OLS Coefficients (SEs)		
	1982 Body Mass Index		
WOMEN	<19	24-29	30+
a. Cross section (N=2259)			
(1)	.00 (.03)	-.03 (.03)	-.24* (.05)
(2)	-.00 (.03)	-.04 (.03)	-.25* (.05)
(3)	-.01 (.03)	-.03 (.02)	-.22* (.05)
b. Sister diffs. (n=288)			
(1)	-.10 (.09)	.04 (.08)	-.15 (.14)
(2)	-.10 (.09)	.03 (.08)	-.19 (.15)
(3)	-.12 (.08)	.01 (.08)	-.18 (.15)
	1982 Body Mass Index		
MEN	<20	25-29	30+
a. Cross section (N=3442)			
(1)	-.09* (.03)	-.02 (.02)	-.06# (.04)
(2)	-.09* (.03)	-.02 (.02)	-.05 (.04)
(3)	-.10* (.03)	-.01 (.02)	-.05 (.04)
b. Brother diffs. (N=570)			
(1)	-.02 (.05)	-.08* (.04)	-.13# (.08)
(2)	-.02 (.05)	-.08* (.04)	-.12# (.08)
(3)	-.03 (.05)	-.08* (.04)	-.10 (.08)

* $p<.05$; # $.05<p<.10$

(1) Controls include years of education, actual labor market experience, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988, dummy variables for "any children" and an interaction of "any children" times age of youngest child.

(3) Controls in (2) plus seven occupation dummy variables. See text for details.

Table 7a: Regression-Adjusted Differences in 1988 Income by 1988 and 1982 BMI, Women.
Dependent variable = ln(Income/Needs in 1988)

	OLS Coefficients (SEs)		
	Body Mass Index		
	<19	24-29	30+
1988 BMI			
a. Cross section (N=4188)			
(1)	-.04 (.04)	-.10* (.03)	-.13* (.04)
(2)	-.04 (.04)	-.07* (.03)	-.14* (.03)
b. Sister diffs. (n=609)			
(1)	.20# (.12)	-.04 (.07)	-.11 (.11)
(2)	.27* (.11)	-.03 (.06)	-.04 (.10)
1982 BMI			
a. Cross section (N=4188)			
(1)	.03 (.04)	-.14* (.03)	-.25* (.06)
(2)	.02 (.03)	-.10* (.03)	-.21* (.05)
b. Sister diffs. (N=609)			
(1)	.02 (.09)	-.12 (.08)	-.33* (.16)
(2)	.01 (.08)	-.07 (.07)	-.14 (.15)

* $p<.05$; # $.05<p<.10$

(1) Controls include years of education, age, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988 and dummy variables for "any children" and an interaction of "any children" and age of the youngest child.

Table 7b: Regression-Adjusted Differences in 1988 Income by 1988 and 1982 BMI, Men.
Dependent variable = ln(Income/Needs in 1988)

	OLS Coefficients (SEs)		
	Body Mass Index		
	<20	25-29	30+
1988 BMI			
a. Cross section (N=3859)			
(1)	-.22*	.13*	.02
	(.06)	(.03)	(.04)
(2)	-.21*	.12	.01
	(.06)	(.03)	(.04)
b. Brother diffs. (n=781)			
(1)	.17	.06	-.28*
	(.15)	(.06)	(.10)
(2)	.23	.07	-.26*
	(.14)	(.06)	(.10)
1982 BMI			
a. Cross section (N=3859)			
(1)	-.14*	.05	-.04
	(.04)	(.03)	(.06)
(2)	-.13*	.05#	-.05
	(.04)	(.03)	(.06)
b. Brother diffs. (N=615)			
(1)	-.04	-.03	-.22
	(.10)	(.08)	(.15)
(2)	-.05	.01	-.21
	(.10)	(.07)	(.15)

* $p<.05$; # $.05<p<.10$

(1) Controls include years of education, age, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988, dummy variables for "any children" and an interaction of "any children" with age of youngest child.

Table 7c: Regression-Adjusted Differences in 1988 Income by 1988 and 1982 BMI, Persons Who Were Unmarried and Childless in 1982. Dependent variable = ln(hourly wage in 1988)

	OLS Coefficients (SEs)		
WOMEN	1982 Body Mass Index		
	<19	24-29	30+
a. Cross section (N=2189)			
(1)	.03 (.05)	-.15* (.05)	-.33* (.09)
(2)	.01 (.04)	-.10* (.04)	-.28* (.08)
b. Sister diffs. (n=289)			
(1)	.08 (.13)	-.01 (.12)	-.27 (.28)
(2)	-.00 (.13)	.03 (.12)	.11 (.27)
MEN	1982 Body Mass Index		
	<20	25-29	30+
a. Cross section (N=3015)			
(1)	-.17* (.05)	.06 (.04)	-.02 (.08)
(2)	-.15* (.05)	.07# (.04)	-.02 (.08)
b. Brother diffs. (N=430)			
(1)	.03 (.12)	-.09 (.10)	-.31 (.19)
(2)	.01 (.12)	-.05 (.10)	-.29 (.19)

* $p<.05$; # $.05<p<.10$

(1) Controls include years of education, actual labor market experience, dummy variables for race/Hispanic identification (2), SMSA (2) and region (3).

(2) Controls in (1) plus two dummy variables for marital status in 1988, dummy variables for "any children" and an interaction of "any children" times age of youngest child.

Table 8: Fraction Reporting that Health Limits Ability to Work, or Amount or Type of Work in 1988

	BMI Category			
Women	<19	19-23	24-29	30+
1982 BMI	7.6	8.2	8.8	14.0
Number of observations	711	3139	962	236
1988 BMI	9.5	6.2	9.4	14.3
Number of observations	442	2473	1474	659
Men	<20	20-24	25-29	30+
1982 BMI	6.1	5.2	6.2	9.8
Number of observations	506	3196	1003	205
1988 BMI	10.4	4.9	5.0	9.5
Number of observations	222	2367	1774	547

Table 9a: Proportion Who Agreed With Various "Self-Esteem" Statements, by BMI Category, Women[1]

Age 15-23 Statements (1980) *Age 22-30 Statements (1987)*	Age 17-25 BMI (1982) *Age 23-31 BMI (1988)* <19	19-23	24-29	30+
1. I feel I am a person of worth, at least on an equal basis with others.	99.0 *99.5*	98.7 *98.9*	97.5 *98.5*	97.4 *96.8*
2. I feel that I have a number of good qualities.	96.9 *99.8*	98.0 *99.2*	97.1 *99.0*	96.9 *98.3*
3. All in all, I am inclined to feel that I am a failure.	3.9 *2.7*	4.3 *2.6*	5.0 *2.6*	7.0 *3.5*
4. I am able to do things as well as most other people.	95.9 *97.9*	97.1 *98.7*	95.2 *98.1*	96.1 *97.2*
5. I feel I do not have much to be proud of.	6.7 *4.3*	6.6 *4.4*	9.8 *6.4*	10.0 *7.4*
6. I take a positive attitude toward myself.	91.9 *93.9*	92.8 *95.9*	90.7 *95.8*	86.0 *93.4*
7. On the whole, I am satisfied with myself	90.3 *94.8*	91.0 *93.9*	88.3 *91.0*	86.5 *88.9*
8. I wish I could have more respect for myself.	34.1 *20.7*	33.0 *19.6*	35.8 *22.9*	42.3 *27.7*
9. I certainly feel useless at times.	48.5 *28.6*	44.3 *26.0*	44.4 *27.2*	45.6 *31.9*
10. At times, I think I am no good at all.	27.8 *11.4*	23.2 *10.0*	24.3 *10.3*	23.6 *12.0*
Approximate sample size	702 *440*	3074 *2422*	943 *1447*	229 *647*

Notes:

1. Figures in the table are proportions of respondents who answered "Agree" or "Strongly Agree" to the statement.

Table 9b: Proportion Who Agreed with Various "Self- Esteem" Statements, by BMI Category, Men[1]

Age 15-23 statements (1980) *Age 22-30 statements (1987)*	Age 17-25 BMI (1982) *Age 23-31 BMI (1988)* <19	20-24	25-29	30+
1. I feel I am a person of worth, at least on an equal basis with others.	97.5 *97.6*	98.1 *98.2*	97.7 *98.2*	99.0 *97.7*
2. I feel that I have a number of good qualities.	97.1 *99.1*	98.1 *99.1*	98.5 *98.9*	98.5 *98.7*
3. All in all, I am inclined to feel that I am a failure.	3.3 *1.9*	4.1 *2.2*	3.8 *2.4*	2.9 *3.0*
4. I am able to do things as well as most other people.	96.1 *98.6*	97.1 *98.0*	97.5 *98.5*	96.6 *97.9*
5. I feel I do not have much to be proud of.	9.8 *6.2*	7.7 *5.8*	8.0 *5.6*	10.3 *5.9*
6. I take a positive attitude toward myself.	92.4 *96.7*	94.0 *96.3*	94.4 *97.0*	93.7 *96.6*
7. On the whole, I am satisfied with myself	91.6 *93.8*	92.2 *92.1*	92.6 *92.4*	90.2 *93.2*
8. I wish I could have more respect for myself.	41.6 *28.9*	36.5 *23.5*	35.5 *23.7*	41.0 *25.4*
9. I certainly feel useless at times.	38.7 *27.3*	35.4 *20.8*	36.2 *17.8*	34.1 *20.7*
10. At times, I think I am no good at all.	20.3 *11.9*	17.7 *7.0*	16.5 *7.3*	18.0 *7.2*
Approximate sample size	488 *211*	3102 *2273*	973 *1705*	205 *529*

1. Figures in the table are proportions of respondents who answered "Agree" or "Strongly Agree" to the statement.