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Health, Obesity, and Earnings

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Abstract: Published reports and economic theory sug-
gest that a worker's earnings may be affected by his degree
of obesity. The purpose of this research was to estimate the
size of such an effect. The earnings-obesity hypothesis was
tested with data from the National Longitudinal Survey of
Mature Men. Results of the test suggest that, for members of
that sample, there is no earnings-depressant effect due to
obesity. (*Am J Public Health* 1980; 70:1006-1009.)

Introduction

On January 2, 1974, *The New York Times* quoted a
study by Robert Half Personnel Agencies finding that over-
weight executives are penalized $1,000 per pound of excess
weight during the courses of their careers.* Such an account
raises an interesting issue concerning the nature of labor
markets and the market value of health capital: is weight re-
duction *per se*, apart from improvement in health status, a
worthwhile investment in human capital?** While several
scholars have found health status to be a significant determi-
nant of labor market experience,[2] none have looked at the
independent effect of weight.*** This paper attempts to fill
that gap in the literature.

Economic theory suggests three market processes
which might lead to a wage depressant effect of obesity,
apart from other aspects of health status. The first of these
can be described as "cosmetic discrimination," a simple dis-
taste for overweight employees, measured as a coefficient of
discrimination.[4] The second theory predicting a wage de-
pressant effect of obesity is that of statistical discrimination.[5]
An individual's degree of obesity may be perceived by his
employer as a proxy for some nonobservable productivity-
related characteristic such as discipline or intelligence. An
employer may then hire the obese employee only at a re-
duced wage. Statistically, the resulting low wages would
constitute an obesity-related effect. The third theory predict-
ing lower wages for obese individuals relates to human capi-
tal acquisition through on-the-job training. If an employer
should fail to provide on-the-job training to the employee
who displays obesity, that employee's wages would increas-
ingly lag behind the wages of others.‡

Whatever the source of the hypothesized wage depres-
sant effect, it may manifest in any or all of three forms:

> "You can never be too rich or too thin." (*Rich/Thin*)
> Wages may be negatively related to the degree of obesity
> in a linear fashion. That is, controlling for the other fac-
> tors which influence wages (including health status),
> wages should be negatively related to the ratio of actual
> weight to desired weight.

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*Despite repeated requests, the authors have been unable to to
secure a copy of the original study by Robert Half Personnel
Agencies.

**Human capital consists of the productive capacity embodied
in individual workers and amenable to change through investment in
education and health.[1]

***The authors recognize that in focusing on the effect of obesi-
ty on the earnings of the employed, they may fail to capture the
greatest effect of obesity on income: differential labor force partici-
pation.[3] Further, casual observation suggests that the high carbohy-
drate diets of many low income families may generate reverse causa-
tion, low income generating obesity. We have not attempted to con-
trol for this simultaneity.

‡This would be so if general and job-specific on-the-job training
were jointly produced.[1]

TABLE 1—Determinants of Hourly Earnings Full Sample

Independent Variables	Dependent Variables*					
	WG	WG	WG	LNWG	LNWG	LNWG
Constant	3.98	4.51	4.17	1.38	1.56	1.46
Health	−0.40	−0.39	−0.39	−0.11	−0.11	−0.11
(0.13)	(0.13)	(0.13)	(0.13)	(0.13)	(0.03)	(0.03)
Rich/Thin	0.35			0.12		
	(0.15)			(0.04)		
Body Beautiful		−0.17			−0.05	
		(0.12)			(0.02)	
Fat Man			0.33			0.10
			(0.11)			(0.03)
White Collar	1.72	1.71	1.72	0.23	0.23	0.23
	(0.16)	(0.16)	(0.16)	(0.04)	(0.04)	(0.04)
Education	0.13	0.13	0.13	0.03	0.03	0.03
	(0.02)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)
Age	−0.04	−0.04	−0.04	−0.01	−0.02	−0.01
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)
Non-White	−0.53	−0.51	−0.52	−0.17	−0.16	−0.16
	(0.14)	(0.14)	(0.14)	(0.03)	(0.03)	(0.03)
Married	0.68	0.70	0.69	0.20	0.20	0.20
	(0.17)	(0.17)	(0.17)	(0.04)	(0.04)	(0.04)
Non-SMSA	−0.76	−0.76	−0.75	−0.22	−0.21	−0.21
	(0.12)	(0.12)	(0.13)	(0.03)	(0.03)	(0.03)
Public Employee	0.22	0.22	0.22	0.11	0.11	0.11
	(0.14)	(0.14)	(0.14)	(0.03)	(0.03)	(0.03)
NE Region	0.40	0.41	0.40	0.11	0.11	0.11
	(0.16)	(0.16)	(0.16)	(0.04)	(0.04)	(0.04)
NC Region	0.54	0.55	0.54	0.18	0.19	0.19
	(0.16)	(0.16)	(0.16)	(0.04)	(0.04)	(0.04)
West Region	0.75	0.77	0.77	0.24	0.24	0.24
	(0.20)	(0.19)	(0.19)	(0.04)	(0.05)	(0.04)
R^2	0.23	0.23	0.23	0.23	0.23	0.23

*WG = Hourly Wage
LNWG = Natural Log of Hourly Wage
Standard errors in parentheses

"The body beautiful." (*Body Beautiful*) Wages may be depressed if the individual's weight falls outside a range of weights acceptable for his height. The acceptable weight range is defined as the closed interval from the lower bound for a person of slight build to the upper bound for a person of heavy build on an actuarial chart of desired weights.‡‡ Wage depression would be measured as a penalty of equal value for all whose weight falls outside these bounds.

"Nobody loves a fat man." (*Fat Man*) We hypothesize that the individual will suffer a wage penalty if his weight exceeds the maximum desired weight. All overweight individuals would be equally penalized.

Methods

The data employed in testing the models described above were drawn from the 1973 responses to the National

‡‡Using standard insurance tables for desired weight and ordinary least squares methods, the authors estimated the following relationships:
lower bound for a man of slight build = .2(height) + .026 (height)²
upper bound for a man of heavy build = .4(height) + .03 (height)²
where height is measured in inches.

Longitudinal Survey for mature men.‡‡‡ The sample contained 2,356 men between the ages of 51 and 65. Data were available on earnings, hours and weeks worked, presence or absence of a work-limiting health condition, age, race, years of schooling, marital status, occupational group, type of employer (public or private), residence (census region and rural or urban), weight, and height. To estimate the effects of the independent variables on the earnings of full-time workers, only full year workers were included.

The weight measure is based on insurance industry tables of desired weights for men of varying heights.[6] For the "never too rich or too thin" ("*Rich/Thin*") hypothesis, we have employed the ratio of actual to desired body weight. The midpoint (w) of the ideal weight range for men of medium build is taken as desired weight and was estimated (from actuarial tables) by the following formula:

‡‡‡The National Longitudinal Survey is conducted by the Ohio State University Center for Human Resources Research for the US Department of Labor. Unfortunately, the surveys for young and mature women did not request information on weight and height. There is no published source for the Survey; a widely circulated reference is: Center for Human Resources Research: National Longitudinal Survey Handbook. Columbus, Ohio State University, 1975 (mimeo).

TABLE 2—Determinants of Hourly Earnings White Collar Only

Independent Variables	Dependent Variables*					
	WG	WG	WG	LNWG	LNWG	LNWG
Constant	1.37	1.91	1.56	1.02	1.17	1.10
Health	-1.08	-1.06	-1.06	-0.20	-0.19	-0.19
	(0.54)	(0.54)	(0.54)	(0.09)	(0.09)	(0.09)
Rich/Thin	0.50			0.14		
	(0.40)			(0.06)		
Body Beautiful		-0.17			-0.03	
		(0.39)			(0.07)	
Fat Man			0.41			0.08
			(0.38)			(0.07)
Education	0.27	0.27	0.27	0.03	0.04	0.04
	(0.06)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)
Age	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.05)	(0.05)	(0.05)	(0.01)	(0.01)	(0.01)
Non-White	-1.82	-1.79	-1.81	-0.33	-0.32	-0.33
	(0.66)	(0.66)	(0.66)	(0.11)	(0.11)	(0.11)
Married	1.60	1.77	1.75	0.28	0.33	0.32
	(0.80)	(0.79)	(0.79)	(0.13)	(0.14)	(0.14)
Non-SMSA	-1.49	-1.48	-1.47	-0.26	-0.26	-0.26
	(0.45)	(0.45)	(0.45)	(0.08)	(0.08)	(0.08)
Public Employee	0.74	0.77	0.78	0.24	0.25	0.25
	(0.47)	(0.48)	(0.48)	(0.08)	(0.08)	(0.08)
NE Region	0.31	0.35	0.36	0.05	0.07	0.07
	(0.51)	(0.51)	(0.51)	(0.09)	(0.09)	(0.09)
NC Region	0.39	0.42	0.41	0.12	0.13	0.13
	(0.54)	(0.54)	(0.54)	(0.09)	(0.09)	(0.09)
West Region	0.81	0.86	0.85	0.19	0.20	0.20
	(0.61)	(0.61)	(0.61)	(0.11)	(0.11)	(0.11)
R^2	0.12	0.17	0.13	0.14	0.13	0.13

*WG = Hourly Wage
LNWG = Natural Log of Hourly Wage
Standard errors in parentheses

$$w = .03 \text{ (height)} + .03 \text{ (height)}^2$$

where height is measured in inches.*

Our estimation technique was ordinary least squares regression analysis, with hourly earnings as the dependent variable. We estimated both linear and logarithmic specifications of the dependent variable.** The estimated coefficients for the independent variables indicate their effects on hourly earnings. The coefficients of the continuous variables (such as age) indicate the change in hourly earnings for each unit change in the explanatory variable (e.g., years). Dichotomous variables, such as marital status, indicate a "shift" effect on earnings, for example, the effect of being married on average earnings.

Results

The model was applied to both the full sample (Table 1) and white collar workers only (Table 2). The non-weight variables in the equation show the effects usually found by economists. For example, each year of education contrib-

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*This equation is based on an ordinary least squares regression. Data were drawn from a table of desired weights found in a popular guide to weight control.
**The non-linear specification is less intuitive, but is generally considered to be more desirable from a theoretical standpoint.

utes about 13 cents to average hourly earnings (Columns 1-3 in Table 1). The effect of poor health on wages status is negative and significant in all cases. White collar employment, being married, public sector employment, and residing outside the South raise wages, while residing outside an SMSA and being older lower wages.

We found no depression in wages because of obesity. In fact our results indicate the opposite—a premium for obesity. The positive sign of the coefficient of "Rich/Thin" means that one must reject the hypothesis of no impact of obesity on wages. Instead, wages rise as weight rises for individuals within our sample—35 cents for every 100 per cent increase in the ratio of actual to ideal weight (by the linear specification).

The remaining two weight variables are dichotomous. The first ("Body Beautiful") equals one when weight falls within the lower and upper bounds of those with slender and heavy builds, respectively. The negative coefficients estimated for this variable indicate *lower* wages for those who fall within the "Body Beautiful" range—a 17 cent per hour reduction for the linear specification. Finally, "Fat Man" equals one when a person's weight exceeds the upper bound for a man of that height with a heavy build.*** Again, con-

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***Specifications of "Fat Man" using 10, 20, and 30 per cent overweight "cutoffs" were also tested. For none of these was there any significant depressant effect.

trary to our expectations those individuals achieve a 33 cent premium in hourly wages for being overweight (Table 1, linear specification). The coefficients are significant for the full sample but "Rich/Thin" is the only significant weight variable for white collar workers and only in the logarithmic form.

Discussion

Our results indicate no significant negative effects of obesity on the earnings of mature men working full time. Indeed, we find a small positive effect of obesity on earnings. In our sample, obesity does not correlate strongly with health status,‡ nor does there appear to be a pure preference for slender men in the labor market.

The results reported here suggest the existence, among mature men, of a "portly banker" effect. Large size may generate a "non-verbal signal" of power, strength, or capability which commands respect from co-workers and em-

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‡The simple correlation of "Rich/Thin" with health status for the entire sample was −0.00096. Readers should exercise caution in interpreting that correlation, as the health status variable was dichotomous. Other zero-order correlations are available from the authors on request.

ployers. As an investment in human capital, then, any returns from weight loss would be derived from its effect on the length of working life, not on increased earnings at any given age. We wish, however, to reiterate that our analysis was limited to mature men. These results should not be generalized to entry level males or to female workers.

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Epidemiology Exchange: Call for Abstracts

The Epidemiology Section of APHA will sponsor the annual Epidemiologic Exchange on Wednesday, October 22, 1980, at APHA's Annual Meeting in Detroit. The Exchange will provide a forum for presentation of investigations, studies, methods, etc., which have been conceived, conducted, and/or concluded so recently that abstracts could not meet the deadline for other Epidemiology Sessions. Papers submitted should deal with work conducted during the last 6-12 months.

Abstracts should be limited to 200 words; no special form is required. Abstracts should be submitted by October 1, 1980, to Michael B. Gregg, MD, Deputy Director, Bureau of Epidemiology, Center for Disease Control, Atlanta, GA 30333.