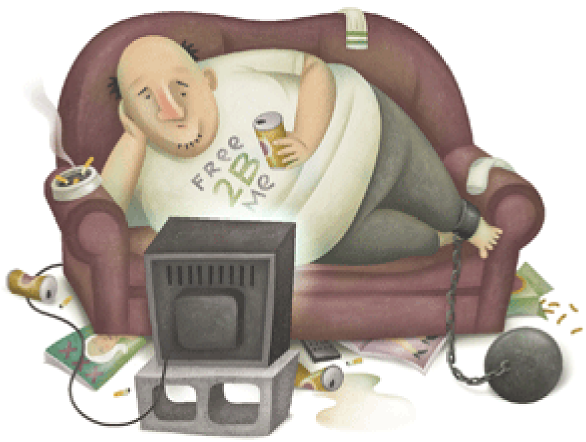
EC4361

AY2012/2013 Semester 1

Project Group 05

Project Report



THE EFFECTS OF OBESITY ON EMPLOYMENT

U091695M	Fong Soon Seng Jeremy
U090778J	Lee Zen Wea
U090656W	Tan Woo Leong Benjamin
U090760W	Lum Wai Seng, Dave Junia

Contents

Abstract

Our paper investigates the effect of obesity on employment. Adopting a study conducted by Morris (2007) on UK health data, we attempt to contribute to the literature by replicating the results using 2008-2009 US health data from the US Panel Study of Income Dynamics (PSID) database. This is useful as the changing prevalence of obesity may change its impact on employment, rendering older estimates obsolete. Moreover, the effects of obesity on employment may differ across countries and contexts.

1. Introduction

Obesity is a rapidly growing health problem that affects an increasing number of countries worldwide (WHO, 1998).[1] In the United States, over a quarter of all adults are obese (HHSD, 2001), while in United States and many other European countries the prevalence of obesity is also rising to epidemic proportions. In the period 1988 – 1994, 20.2 per cent of males and 25.4 percent of females in the United States were obese; by the period of 2007 – 2008, the prevalence had increased to 32.2 percent and 35.5 per cent respectively. The dramatic growth in obesity is a serious concern not only because it is a debilitating condition in its own right, but is also an important risk factor for a number of major diseases including coronary heart disease, type II diabetes, hypertension and stroke (NHLBI, 1998).

In addition to imposing large morbidity and mortality costs, obesity also imposes a substantial financial burden. The direct cost associated with obesity represents 5.7% of the National Health Expenditure in the United States (Wolf and Colditz, 1998). Moreover, the economic cost of obesity to business in the United States is more than 12 billion per annum (Thompson et al., 1998) while at the individual level, obesity may also

[1] Obesity is usually measured in terms of the body mass index (BMI), which is usually computed in adults as an individual's weight in kilograms divided by their height in metres squared (NHLBI, 1998). Obesity is usually defined by a BMI over 30 Kg/m^2

have other consequences that affect economic outcomes such as social stigmatization and discrimination (NHLBI, 1998).

The aim of this paper is to examine the impact of obesity on employment. The analysis is conducted using data from the Panel Study of Income Dynamics (PSID). In particular, we would be using individual and family data as well as data from PSID's Transition to Adulthood Study (TA) to carry out our analysis. We use two approaches: (1) a univariate probit model in which employment measured as a binary variable is regressed against obesity (also measured as a binary variable) as well as a comprehensive set of individual and area covariates. (2) An instrumental variable (IV) regression using a recursive bivariate probit model. We instrument individual obesity using the Body Mass Index (BMI) of the head of the household for each individual. This is positively correlated with individual obesity and is plausibly not itself correlated with the error term in the employment equation.

2. Literature review

Obesity and employment are likely to be correlated because of the following reasons:

1. Obesity causes unemployment. There are two possible reasons namely health and discrimination. First, obesity is a debilitating health condition that lowers the productivity of individuals causing them to be less likely to be employed than other individuals (NHLBI, 1998). Second, discrimination can exist against the obese (Balsa and McGuire, 2003). This includes prejudice on the employers' part and the belief that obese individuals are less productive.
2. Unemployment causes obesity. This may arise when unemployed individuals consume cheap, less-nutritious and fattening food (Cawley, 2004)

Several Studies have previously analysed the effect of obesity on employment. In the first two British Studies, Sargent and Blanchflower (1994) used the 1981 round of the National Child Development Study (NCDS) to examine the impact of obesity on the labour market outcomes of young adults. They report the impact of obesity at age 16 years on unemployment at age 23 years, controlling for race, social class, ability and region of residence. Using a logit model, the authors report that obesity has an insignificant effect on unemployment. Harper (2000) used a later 1991 round of the NCDS to estimate the impact of obesity plus general physical appearance, attractiveness and height at age 23 years on unemployment at age 33 years also using a logit model. As with the earlier study, the results showed that obesity had an insignificant effect on unemployment for both males and females.

Sarlio-Lahteenkorva and Lahelma (1999) used a logit model to analyze the impact of current obesity (measured as a BMI of $30kg/m^2$ or more) on current employment and long term unemployment (defined as being unemployed for two years or more in the previous five year period). Controlling for age, educational attainment, region of residence and limiting longstanding illness they found that obesity has a significant and positive impact on long-term unemployment, and an insignificant effect on current employment for females. On the other hand, obesity had an insignificant effect on both unemployment measures for males.

However, it should be noted that none of the above studies investigated the endogeneity of obesity and employment. While Blanchflower and Harper regress current employment against lagged obesity, which may deal with simultaneity, it will not correct for omitted variables that affect both obesity and employment (for example, time preference, which might affect human capital and taste for work and hence employment and obesity).Morris (2007) addresses the endogeneity problem using an IV regression approach. The instrument used for BMI was the prevalence of obesity in the area in which the respondent lives and data he used was from two rounds of the Health Survey for England. He observed that while obesity was not statistically significant in the probit model for females, the effect of obesity on employment was found to be statistically significant for this group when an IV approach was used. This suggests that the univariateprobit results were biased for this group and underestimate the negative impact of obesity on employment.

Our paper makes two main contributions to the literature. Firstly, it investigates the relationship between obesity and employment in the United States using both the univariateprobit and bivariate probit instrumental variable approaches in order to obtain a better understanding of obesity and employment. Secondly, the data used in our analysis are more recent than those in the earlier studies covering the year 2009. This is useful because increases in the prevalence of obesity over time may affect the impact of obesity on employment rendering older studies obsolete.

3. Data & Descriptive Statistics

3.1 Data

Our data is extracted from the Panel Study of Income Dynamics (PSID). PSID collates data from household surveys since 1968. It provides a wealth of information that includes specific demographic and employment data points of each member of the household. PSID has 3 sub branches that cover child development, transition to adulthood and disability. These 3 branches complement the main interview where data is collected on the head of the household and his wife.

Our paper focuses on characteristics of young adults and draws data heavily from 'transition to adulthood'. The following categories were drawn for each young adult in our dataset: Gender & race; Marital status & Number of children; Health (BMI & BMI Categorization); Education; Employment & Wages; Financial Assistance; Criminal Record.

Information on the head and wife of the household complements our dataset. This may not always be the parents of the young adult in question. For example, should the young adult be living under the roof of his relatives, his uncle and aunt will be the head and wife of the household. The following categories were extracted specific to the head and wife: Height & Weight; Income.

All values extracted from PSID were used verbatim except for the following 2 variables. BMI figures for the head and wife were derived from their height and weight using the standard BMI formula. Also, Age^2 was used to determine if the relationship between employment and age were more polynomial than linear in nature.

3.2 Descriptive Statistics

A total of 1671 samples were utilized from PSID. 47.94% were male and 52.06% female. The age range of our dataset is as follows:

Age	Frequency	Percent	Cumulative
17	80	4.79	4.79
18	190	11.37	16.16
19	210	12.57	28.73
20	224	13.41	42.13
21	214	12.81	54.94
22	255	15.26	70.20
23	223	13.35	83.54
24	226	13.52	97.07
25	49	2.93	100.00

It must be noted that respondents aged 17 and 25 are those who were turning 18 or had just past 24 respectively on the year of the interview.

The BMI percentile breakdown between genders is as follows:

Males

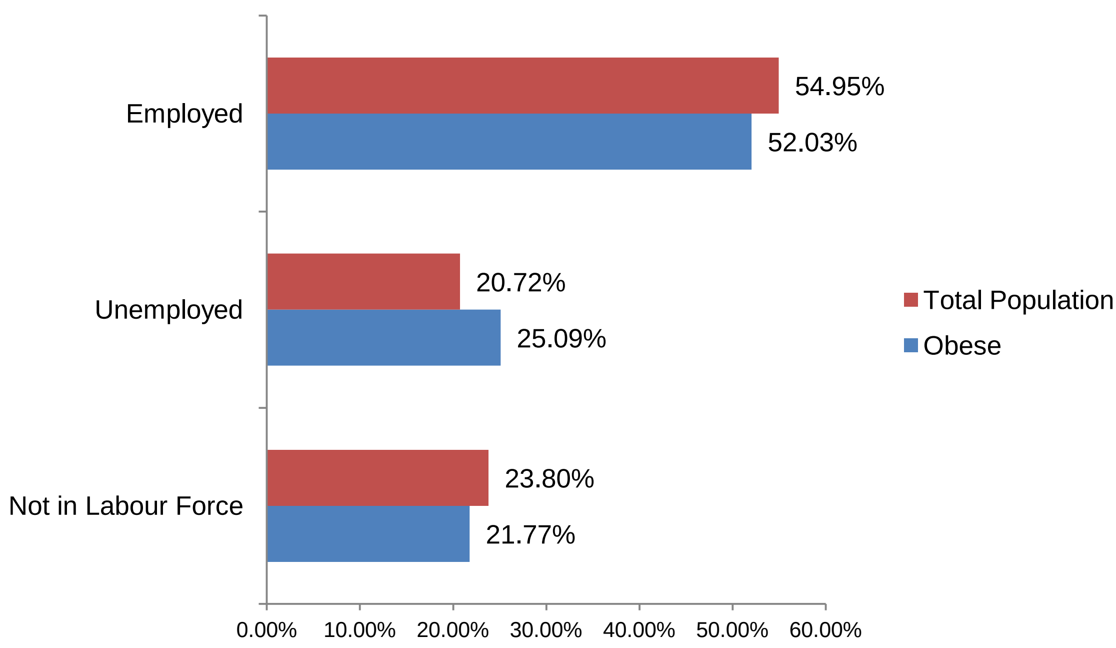
Category	Frequency	Percent	Cumulative
BMI below 18.5: Underweight	17	2.33	2.33
BMI is 18.5 - 24.9: Normal	352	48.22	50.55
BMI is 25.0 - 29.9: Overweight	242	33.15	83.70
BMI is 30.0 or over: Obese	115	15.75	99.45
Respondent refused to answer.	4	0.55	100.00

Females

Category	Frequency	Percent	Cumulative
BMI below 18.5: Underweight	34	4.13	4.13
BMI is 18.5 - 24.9: Normal	434	52.67	56.80
BMI is 25.0 - 29.9: Overweight	188	22.82	79.61
BMI is 30.0 or over: Obese	156	18.93	98.54
Respondent refused to answer.	12	1.46	100.00

The BMI percentile breakdown between males and females do not differ widely. Most respondents fall within the normal range with the overweight category bearing the next highest frequency. Females had a slightly higher percentage of obese respondents

To provide context on unemployment in our data, we compare employment statistics between the obese and the entire population of our dataset:



Not in labour force is defined as respondents who mention that they are unemployed and indicate that they are not looking for a job. These include the disabled, home makers and students. It can be observed that there are minor differences depicting slightly lower employment and higher unemployment for the obese. The validity of such general observations will be more robustly tested.

All values were utilized verbatim from PSID except for Age^2 and the BMI values for Head and Wife. Our variables are defined in the following manner:

Variables	Definition
age	Age of the respondent.
obese	BMI category of respondent. 1 if BMI >= 30, 0 if otherwise.
overwgt	BMI category of respondent. 1 if BMI = 25.0 - 29.9, 0 if otherwise.
underwgt	BMI category of respondent. 1 if BMI < 18.5, 0 if otherwise.
racewhite	Race declared by respondent. 1 if White, 0 if others.
raceblack	Race declared by respondent. 1 if Black, 0 if others.
highsch	Graduation from high school. 1 if Yes, 0 if No.
college	Graduation from college. 1 if Yes, 0 if No.
child1	Respondent has 1 child. 1 if Yes, 0 if No.
child2	Respondent has 2 or more children. 1 if Yes, 0 if No.
singlerom	Respondent is single and in a romantic relationship. 1 if Yes, 0 if No.
married	Respondent is married. 1 if Yes, 0 if No.
arrest09	Respondent has been arrested. 1 if arrested once or more, 0 if never arrested.
agesq	Age of respondent squared.
fundedexp	Respondent's expenses are paid for by others. 1 if Yes, 0 if No.
rent	Respondent's housing rent is paid for by others. 1 if Yes, 0 if No.
hdbmi	BMI value of head of household where respondent lives.
wifebmi	BMI value of wife of household where respondent lives.

4. Methodology

4.1 Univariate Probit Methodology

$$Y_i = a_0 + a_1 S_i + a_2 H_i + a_3 F_i + a_4 C_i + a_5 B_i + u_i$$

The univariate probit model attempts to measure the direct effect of obesity on employment (Y), taking the latter to be a binary variable which has a value of one if the individual is in paid employment and zero otherwise. The model supposes that Y is a linear function of obesity B and other variables, such as schooling factors (S), health status (H), family background factors (F) and other control variables e.g. demographics such as age, gender and ethnicity. This probit model can be estimated by a single equation univariate probit model:

$$y_i^* = \beta_0 X_i + dB_i + \mu_{0i}$$

$$E[\mu_0] = 0 \qquad\qquad Var[\mu_0] = 1$$

Marginal effects are computed for the univariate probit model, where the marginal effect (ME) of being obese on the probability of being in paid employment is the sample average of changes in the marginal predicted probability of being in paid employment with discrete changes (from 0 to 1) in the binary dummy for obesity (B), keeping all other variables x at their observed values. Under standard assumptions, the estimated effect of obesity on employment is the average treatment effect for those who change treatment status (i.e. become obese) because they comply with the assignment to treatment (Imbens and Angrist, 1994; Angrist et al., 1996).

This method assumes that obesity conditional on the covariates is independent of employment (i.e. there is no reverse causality – obesity does not depend on employment). However, if obesity is endogenous, then the conditional independence assumption is violated and the average treatment effect (ATT) from the above methods is biased and gives an unreliable estimate of the causal effect of obesity on employment. Additionally, obesity, we hypothesize, may be correlated to employment through unobserved characteristics of the individuals such as laziness and poor discipline. This correlation would result in an upward bias in the effect of obesity on employment. We attempt to address this problem by using an instrumental variable (IV) approach, described below.

4.2 Instrumental Variable Approach (Recursive Bivariate Probit)

To address the problem of endogeneity and reverse causality, we propose using an IV regression method based on a recursive bivariate probit model, using a two-stage least squares (TSLS) approach of the form:

$$y_i^* = \beta_1 X_i + \delta B_i + \mu_{1i}$$

$$B_i^* = \beta_2 X_i + \alpha Z_i + \mu_{2i}$$

$$E[\mu_1] = E[\mu_2] = 0 \qquad Var[\mu_1] = Var[\mu_2] = 1 \qquad Cov[\mu_1, \mu_2] = \rho$$

The coefficient of interest is δ. ρ is the correlation between the error terms in the obesity and employment equations. This is an appropriate model to use when the dependent variable is binary and we have a binary endogenous explanatory variable. To control for endogeneity using this model requires a suitable instrument Z for obesity. This instrument should be a non-weak predictor of B conditional on x, and must be uncorrelated with μ_1.

We propose using the BMI of the head of households as an instrument for obesity. The household head's BMI, we reason, should be highly correlated with obesity due to genetic similarities within the family and similar diet or eating practices amongst family members (Johannsen, 2012). Moreover, we assume that these factors affect employment only through obesity and are thus uncorrelated with the error term, μ_{1i}. We calculate the effects of obesity on an individual's employment status, using both the household head's BMI and his wife's BMI as instruments for obesity. These results are reported in section 5.2.

5. Regression Results

5.1 Univariate Probit Methodology

5.1.1 Results for Male Employment (Marginal Effect)

We began by dividing our sample along gender lines, and running separate univariate probit regressions for males and females. The results for male employment are reported in table 1 of the appendix. The figures reflect, among other things, the marginal effect (ME) of being obese on the individual's probability of being in paid employment. As mentioned earlier, the ME is the sample average of changes in the marginal predicted probability of being in paid employment with discrete changes in the binary dummy for obesity (B), keeping all other variables x at their observed values. We picked education, health, home and family variables as controls because we believe that these variables can have statistically significant effects on employment and omitting them would result in biased results. The baseline groups for our BMI, race, education and children dummy variables are individuals who are: of normal weight, neither white nor black (in terms of race), of no formal education and with no children.

We ran a series of four regressions (See Appendix, Table 1), the first with only the three BMI categories as regressors (the 'normal' weight dummy was dropped). In our second regression, we added in several key controls such as age, race and education, which we considered to be key factors influencing employment. The third regression included family commitments such as the individual's relationship status and the presence of children. Lastly, we included four more controls for robustness- an age squared term (to control for non-linearity), presence of a criminal arrest record, and whether the individual was receiving support in the form of paid expenses or rent.

For males, the ME of being obese on the probability of being in paid employment is statistically insignificant, small and negative (i.e. being obese decreases the probability of employment as compared to the base group – individuals with normal weight). This is the case even after adding in controls for education, health and other home and family variables. In contrast, we observe a large, negative and statistically significant ME of being underweight on the probability of being in paid employment. While this initial observation may seem to suggest that being underweight has a statistically significant negative correlation with the probability of employment, it is important to note that there are only 15 observations for males in the underweight category which is a very small sample size and as such, these results should not be taken to be representative of the population before carrying out further analysis using a dataset with larger sample size. Variables for education (highsch and college) have a large, positive and statistically significant effect on employment as would be expected.

5.1.2 Results for Female Employment (Marginal Effect)

For females (See Appendix, Table 2), while the ME of being obese on the probability of being in paid employment is five times greater than the males, the direct ME of obesity on the probability of employment for females is negative (i.e. being obese decreases the probability of employment as compared to the base group – individuals with normal weight), as well as being small and insignificant. This is the case even after adding in controls for education, health and other home and family variables. Moreover, the ME of being underweight on the probability of employment was statistically insignificant, small and positive. These preliminary results seem to suggest that obesity and being underweight do not have a significant correlation with a female's probability of employment. Variables for education (highsch and college) have a large, positive and statistically significant correlation on employment as would be expected.

5.2 Instrumental Variable Approach (Recursive Bivariate Probit)

For the IV Approach, we are only interested in comparing the obese group with the rest of the sample. As such, only one dummy variable representing the obese group is included. We also ran two sets of IV regressions using just head's BMI in the first case and both head and wife's BMI in the second case.

The first step of using head's BMI and/or wife's BMI as instruments is to establish that the correlation between the instruments and the endogenous variable is significant. The correlation is highly significant as shown below. Specifically, for the case of using just head's BMI, the t-stats for male is 5.69 while that for female is 8.31.For the case of using both head's and wife's BMI as instruments, a joint significance test is also carried out with the stats of 25.37 and 15.67 for male and female respectively. Results for other covariates are in the appendix. One thing to note is that when wife's BMI is added as an instrument to obesity, number of observations decrease by more than half for both male and female mainly due to exclusion of families that have did not have wife in the family unit. If this instrument is valid, we can also conduct a Hausmann test to indicate if there is endogeneity in obesity at all.

VARIABLES	Male obese	Female obese	Male obese	Female obese
hdbmi	0.018***	0.027***	0.026***	0.011**
	-0.003	-0.003	(0.006)	(0.005)
wifebmi	-	-	0.009**	0.015***
			(0.004)	(0.004)
F(2,n-k-1) k=15	-	-	25.37	15.67
Observations	566	625	252	298
R-squared	0.123	0.272	0.238	0.263

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.2.1 Results for Male and Female Employment

	Univariate Model		IV Model (Head's BMI)		IV Model (Head's & Wife's BMI)	
VARIABLES	Male emp09	Female emp09	Male emp09	Female emp09	Male emp09	Female emp09
obese	-0.080	-0.158	-0.058	-0.287	-0.489	- 1.359***
	(0.172)	(0.152)	(0.478)	(0.333)	(0.545)	(0.473)
Observations	574	635	566	625	252	298
Wald test of exogeneity	-	-	0.9737	0.6772	0.9172	0.0036

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

When obese is instrumented with only head's BMI, the impact of obese on employment remains statistically insignificant for both male and female. However, when wife's BMI is added as an instrument, obese becomes significant for female, i.e. being obese *causes* probability of being in employment to be lower if our assumption of validity of instrument stands.

Assuming that the instruments are valid, the endogeneity of obesity does not significantly affect the univariate probit estimates for males. This is shown from the Wald test value from which we fail to reject the hypothesis that the estimate is consistent and efficient and that the IV estimate is consistent but inefficient. For females, the two sets of IV regressions have disagreeable results.

6. Discussion

We attempt to address the reverse causality and omitted variable bias problem using an IV approach. For this IV approach, we assumed that head's BMI and/or wife's BMI should be highly correlated with obesity due to reasons related to genetic and similar diet in the family and that these factors affect employment only through obesity and are thus uncorrelated with the error term.

However, when wife's BMI is included as an instrument, obesity becomes significant for female. Assuming that the impact of obesity on employment is the same for all individuals independent of whether their family unit has wife, significance of obesity should not change. This is because we believe that both head's and wife's BMI are qualitatively correlated with individual obesity in the same way and are not correlated with the error term. In contrast, for males, almost all other coefficients are insignificant in the second set of IV regression. This might be due to the reduction in sample size when wife's BMI is used.

Since the result shows that the significance of obesity changes for females when wife's BMI is added, the BMI of head and wife are most likely not exogenous, i.e. they are correlated with unemployment other than through its impact on individual obesity. This can plausibly occur through other family factors, such as income, single-parent families and education of parents. Individual's characteristics such as laziness and poor discipline are also likely to be correlated with head's and wife's BMI. Essentially, the head's and wife's IV variables are likely to be correlated with the error term.

Therefore, head's and wife's BMI are not valid instruments for obesity. The validity of the instruments remains in doubt even if improvements such as adding a large number of covariates on family characteristics are carried out. This is because head's and wife's BMI are likely to be correlated with many factors in the family environment that are not observed or measurable yet affect employment of individual. Perhaps this conclusion is unsurprising because good instruments normally come from natural experiment such as policy changes which can easily be justified as exogenous.

7. Concluding Remarks

In this paper, we investigated the impact of obesity on young adults' employment in the US using two different methods and a dataset from the PSID which contains a set of variables that are likely to affect employment of young adults. Obesity is correlated to employment because of health problems and discrimination that might come from being obese, or the reverse causality in which being unemployed leads to consumption of fatty and unhealthy food that causes obesity.

Using a univariate probit model, we found that there is no significant correlation between obesity and employment for both males and females. In an attempt to identity the causal impact of obesity on employment, we applied the IV model using heads' and wives' BMI as instruments for individuals' obesity. However, the two set of IV regressions ran yielded different results for females. We suspect that the instruments used are likely to be correlated to the error term through other family characteristics that affect employment. As such, the validity of the instruments is in doubt.

Overall, findings from this study demonstrate that for young adults in the US, obesity and employment are not significantly correlated. Further research is needed to control for the endogeneity in obesity so as to establish the causal effect of obesity on employment for young adults in the US.

8. Appendix

Table 1: Male Univariate Probit Results

VARIABLES	(1) emp09	(2) emp09	(3) emp09	(4) emp09
obese	0.003	-0.023	-0.019	-0.028
	(0.055)	(0.059)	(0.059)	(0.061)
overwgt	0.072*	0.044	0.040	0.040
	(0.043)	(0.044)	(0.044)	(0.044)
underwgt	-0.336***	-0.384***	-0.364***	-0.381***
	(0.128)	(0.124)	(0.132)	(0.129)
age		0.029***	0.024**	0.399**
		(0.010)	(0.011)	(0.196)
racewhite		0.076	0.068	0.089
		(0.081)	(0.082)	(0.082)
raceblack		-0.135*	-0.143*	-0.128
		(0.080)	(0.080)	(0.081)
highsch		0.228***	0.234***	0.206***
		(0.059)	(0.061)	(0.063)
college		0.247***	0.254***	0.239***
		(0.050)	(0.049)	(0.054)
child1			0.012	0.020
			(0.064)	(0.064)
child2			0.018	0.031
			(0.079)	(0.077)
singlerom			0.100**	0.097**
			(0.041)	(0.041)
married			0.102	0.097
			(0.077)	(0.079)
arrest09				-0.081*
				(0.046)
agesq				-0.009*
				(0.005)
fundedexp				-0.084*
				(0.049)
rent				-0.012
				(0.061)
Observations	575	575	575	574

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2: Female Univariate Probit Results

VARIABLES	(1) emp09	(2) emp09	(3) emp09	(4) emp09
obese	-0.117**	-0.055	-0.050	-0.053
	(0.051)	(0.052)	(0.052)	(0.053)
overwgt	-0.054	-0.013	0.020	0.033
	(0.046)	(0.047)	(0.047)	(0.047)
underwgt	0.071	0.106	0.110	0.094
	(0.087)	(0.076)	(0.069)	(0.071)
age		0.002	0.020**	0.551***
		(0.009)	(0.010)	(0.159)
racewhite		0.042	0.051	0.049
		(0.079)	(0.081)	(0.085)
raceblack		-0.069	-0.052	-0.054
		(0.079)	(0.082)	(0.086)
highsch		0.433***	0.363***	0.323***
		(0.071)	(0.078)	(0.080)
college		0.323***	0.265***	0.218***
		(0.031)	(0.043)	(0.054)
child1			-0.129**	-0.129**
			(0.056)	(0.057)
child2			-0.345***	-0.356***
			(0.076)	(0.076)
singlerom			0.046	0.053
			(0.040)	(0.041)
married			-0.044	-0.036
			(0.074)	(0.075)
arrest09				-0.177***
				(0.064)
agesq				-0.013***
				(0.004)
fundedexp				-0.051
				(0.043)
rent				0.128***
				(0.046)
Observations	636	636	636	635

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: IV Regression Full Results

	IV Model (Head's BMI)		IV Model (Head's & Wife's BMI)	
	Male	Female	Male	Female
VARIABLES	emp09	emp09	emp09	emp09
age	1.187**	1.574***	0.971	2.091***
	(0.574)	(0.490)	(0.895)	(0.727)
agesq	-0.027*	-0.036***	-0.022	-0.047***
	(0.014)	(0.012)	(0.021)	(0.017)
racewhite	0.118	0.172	0.065	-0.024
	(0.257)	(0.262)	(0.365)	(0.325)
raceblack	-0.440*	-0.080	-0.262	-0.036
	(0.252)	(0.258)	(0.397)	(0.349)
highsch	0.616***	1.008***	0.576*	0.813**
	(0.168)	(0.225)	(0.312)	(0.386)
college	1.035***	0.934***	0.578	0.476
	(0.315)	(0.302)	(0.468)	(0.468)
rent	-0.045	0.478**	-0.053	0.300
	(0.179)	(0.187)	(0.259)	(0.253)
fundedexp	-0.249*	-0.178	-0.028	0.069
	(0.139)	(0.128)	(0.210)	(0.182)
child1	0.058	-0.426***	-0.166	-0.207
	(0.193)	(0.157)	(0.332)	(0.266)
child2	0.051	-0.966***	-0.493	-0.821**
	(0.237)	(0.204)	(0.377)	(0.359)
singlerom	0.311**	0.160	0.303	0.138
	(0.125)	(0.125)	(0.201)	(0.207)
married	0.309	-0.077	0.539	-0.201
	(0.279)	(0.218)	(0.393)	(0.252)
arrest09	-0.207	-0.477***	-0.025	-0.597**
	(0.134)	(0.169)	(0.220)	(0.270)
hdbmi				
wifebmi				
obese	-0.058	-0.287	-0.489	-1.359***
	(0.478)	(0.333)	(0.545)	(0.473)
Constant	-12.955**	-17.287***	-10.482	-22.507***
	(6.001)	(5.078)	(9.287)	(7.501)
Observations	566	625	252	298

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

9. References

Angrist, J.D., Imbens, G.W., Rubin, D.B., 1996. Identification of causal effects using instrumental variables. Journal of the American Statistical Association 91, 444–455.

Balsa, A.I., McGuire, T.G., 2003.Prejudice, clinical uncertainty and stereotyping as sources of health disparities. Journal of Health Economics 22, 89–116.

Cawley, J., 2004. The impact of obesity on wages. Journal of Human Resources XXXIX, 451–474.

Everett, M., 1990. Let an overweight person call on your best customers? Fat chance. Sales and Marketing Management 142, 66–70.

Harper, B., 2000. Beauty, stature and the labour market: a British cohort study. Oxford Bulletin of Economics and Statistics 62, 771–801.

HHSD [Department of Health and Human Services, Public Health Service], 2001.The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity. Office of the Surgeon General, Rockville, MD.

Imbens, G.W., Angrist, J.D., 1994. Identification and estimation of local average treatment effects.Econometrica 62,467–475.

Johannsen Darcy L., Johannsen Neil M., Specker Bonny L., 2012. Influence of Parents' Eating Behaviors and Child Feeding Practices on Children's Weight Status, Obesity: A Research Journal, Vol. 14 Issue 3.

Morris S., 2007. The impact of obesity on employment.Labour Econ14, 413–33.

NHLBI [National Heart, Lung and Blood Institute], 1998.Clinical guidelines on the identification, evaluation and treatment of overweight and obesity in adults. NIH Publication, vol. 98–4083. National Institutes of Health, New York.

Pagan, J.A., Davila, A., 1997.Obesity, occupational attainment and earnings. Social Science Quarterly 78, 756–770.

Sargent, J.D., Blanchflower, D.G., 1994. Obesity and stature in adolescence and earnings in young adulthood: analysis of a British birth cohort. Archives of Pediatrics and Adolescent Medicine 148, 681–687.

Sarlio-Lahteenkorva, S., Lahelma, E., 1999. The association of body mass index with social and economic disadvantage in women and men. International Journal of Epidemiology 28, 445–449.

Thompson, D., Edelsberg, J., Kinsey, K.L., Oster, G., 1998. Estimated economic costs of obesity to US business. American Journal of Health Promotion 13, 120–127.

WHO [World Health Organization], 1998. Obesity: Preventing and Managing the Global Epidemic. World Health Organization, Geneva.

Wolf, A.M., Colditz, G.A., 1998. Current estimates of the economic cost of obesity in the United States. Obesity Research 6, 97–106.