"The Spousal Effect of Obesity: An Analysis of Older Adults" [a]

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Abstract

It is well established that marriage is associated with better health. Body-weight is an important health-related characteristic, and yet literature regarding the relationship between body-weight and marriage is mixed. Most of these studies have been the product of disciplines other than economics. Therefore, the focus of these other studies has sought to find a relationship between the dynamics of marriage and body-weight. The current study seeks to make a different contribution to the literature. The main objective is to provide an overall assessment of the relationship between the body mass indices of each member of a married couple. In particular, we are focusing on the older adult population, since the CDC estimates that 65.1% of the older adult population have a body mass index that is above normal (>25 kg/ m^2). We find evidence of spillover effects between the BMI levels of husbands and wives. In addition, our results suggest that there are gender differences in how the BMI levels of husbands and wives respond to each others characteristics and changes in their health.

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I. Introduction

Obesity has been acknowledged as a global epidemic.[1] It is estimated that 1 billion adults are overweight and at least 300 million adults are obese globally (WHO, 2006). This epidemic affects all ages and ethnicities. It has been widely published that the United States (US) has been a major contributor in the growth of the global epidemic. In fact, CDC estimates that in 2005 35% of the adult population (20 years old and older) was overweight and 25% were obese. While some studies suggest that overweight and obesity are less of a problem for older adults, the CDC also finds that 67.2 % of the adult population between the ages of 45 and 64 years old are above a healthy weight, with the prevalence of overweight and obesity at 38.5 % and 28.7%. For the individuals between 65 and 74 years of age there is little improvement in these numbers, 65.1% are above a healthy weight, with 39.9% being overweight and 25.2% having a BMI in the range for obesity. Given these numbers and the potential impact that these older adults will have on Medicare expenditures, this population is worthy of study. From a policy perspective, it would be useful to determine how to reduce these numbers of obese and overweight individuals.

In order to determine how to effect a change in the number of overweight and obese adults we must first determine, what factors are contributing to an individual's BMI level. Since the CDC finds that BMI levels in the adult population are relatively stable and exhibit very little change over a two year period, it will be helpful to explain this stability. Especially since 1) it is widely known that the simple mechanism through which BMI increases (decreases) occur from expending less (more) energy (as measured by kilocalories) than

[1] Obesity is commonly measured by the body mass index (BMI) greater than 30. BMI is measured as an individuals weight in kilograms divided by their height in meters squared (kg/m^2). While there is some debate regarding the appropriateness of this measure, it is widely accepted and therefore, is the measure used in this study. Overweight is measured as $25<BMI\leq 30$ kg/m^2.

we consume, 2) more information is available regarding the number of kilocalories we are consuming and 3) more information on the importance of expending kilocalories via exercise is more widely available.

There are many unanswered questions related to the main question: why individuals do not use the information provided to them to reduce their BMI level? One such unanswered question is the importance of “spillover effects”? Spillover effects between spouses are rarely modeled in the previous literature. However, this should not suggest that of spillover effects do not exist. For instance, take a married couple with strong complementaries in leisure, if this married couple distributes more (less) leisure time to kilocalorie expending activities rather than kilocalorie consumption then they will see reductions (increases) in their respective BMI levels. If these effects are important measures of behavior, the failure to recognize them could lead to large errors in predicting the effect of any policy change on behaviors that are related to BMI levels.

There are several key findings of the current paper. First, we find evidence of the existence of spillover effects. Second, we model the relationship between the BMI levels, probability of producing an above normal BMI, probability of producing declines in the BMI level and probability of engaging in vigorous activity as a simultaneous relationship between a husband and a wife. This model finds that there are gender differences in the responsiveness of the couple to each others characteristics and changes in their characteristics which contradicts the idea that there are complementarites between the couple.

II. Previous Literature

There exists a rapidly growing body of literature in the economics of weight. For instance, there have been studies on the effect of weight on wages (Register and Williams, 1990; Behrman and Rosenzweig, 2001, Cawley, 2004, Baum and Ford, 2004), the effect of food prices on obesity (Chou, Grossman and Saffer, 2004; Rashad, Grossman and Chou, 2006), the addictive component of obesity growth (Cawley, 1999, Cawley, Markowitz, Tauras, 2004), and other studies use structural models to explain the growth in BMI (Philipson and Posner, 1999; Lakadawalla and Philipson 2002; Philipson, 2001; Rashad, 2006). What we have learned from these studies is that as our lifestyles became more sedentary, food prices decreased, and the time we could devote home production of food, and the time we could devote to exercise (and leisure) fell, the level of obesity has risen.

Another group of articles has changed the focus from the economics of the obesity trend to the economics of the physiology of gaining weight. These studies have focused on explaining the physiology of weight gain in the language of economics to examine why people routinely choose to consume more calories then they expend. In other words, since people lose utility from being overweight, why are their so many overweight people? The answers to this question are varied. The extant literature attributes the number of people with BMIs in the overweight or obese (above normal BMI) range to the disutility of dieting (Goldfarb, Leonard and Suranovic, 2003), misunderstandings of physiology of weight gain (Goldfarb and Suranovic, 2006), the lack of the skills necessary to correctly (or accurately) assess the risk involved (Khan and Tsai, 2004), and the reduction in smoking levels (Chou, Saffer, and Grossman, 2004) or not (Gruber and Frakes, 2006). Other papers have focused on the food choice in schools to explain childhood BMI levels (Anderson and Butcher, 2006), advertising (Chou, Rashad and Grossman, 2005).

Still more research has tried to empirically quantify if obesity is related to high school completion (Kenkel, Lillard and Mathios, 2006), higher health care costs (Bhattachraya and Bundorf, 2005) or employment probabilities (Cawley and Danziger, 2004). As the wealth of literature on the economics of obesity has grown tremendously in recent years, so has the public outcry for change. Most notably, New York City announced in September 2006 the Board of Health in New York City voted unanimously to prohibit the sale of food that has more that a minute amount of artificial trans fats in all restaurants. We can try to limit access to food, make good food cheaper, etc., however, the main problem will remain, how do we get people to consume less calories than they expend? or how do we modify behavior? This paper seeks to approach such behavioral questions from a slightly different angle, we seek to estimate the impact that spouses have on each others obesity levels and activity levels. Further, we estimate the multiplier or spill over effects that result from getting one member of a couple to modify their behavior and reduce their BMI levels.

III. Methods

As previously stated, our goal is to determine the impact that spouses have on each others obesity level, their activity levels and subsequently on the probability of reducing their BMI levels. To determine impact that spouses have on each other we are interested in estimating the following regression system:

(1)
$$\begin{aligned} Y_{ht} &= \alpha_0 + \alpha_1 Y_{wt} + \alpha_2 X_{ht} + \alpha_3 H_{ht} + \varepsilon_{ht} \\ Y_{wt} &= \beta_0 + \beta_1 Y_{ht} + \beta_2 X_{wt} + \beta_3 H_{wt} + \varepsilon_{wt} \end{aligned}$$

Where t=1,…,8, h (w) denotes data regarding the husband (wife), $Y_{h(w)}$ the dependent variable of interest, (BMI level, an indicator of an above normal BMI, an indicator of a reduction in BMI, an indicator of participation in vigorous activity), $X_{h(w)}$ is a vector of characteristics for the husband (wife), $H_{h(w)}$ is a vector of health shocks felt by the husband (wife) and $\varepsilon_{h(w)}$ is a random error term attributed to the function for the husband (wife). Ex ante, if we believe that there are complementaries in leisure/leisure activities such as exercise (activity level), food preparation and consumption, we would expect α_1 (β_1)>0.

Obviously, if we estimate the system as described in (1) we are ignoring the fact that the true system at hand is described as:

(2)
$$Y_{ht} = \frac{1}{1-\alpha_1\beta_1}[(\alpha_0 + \alpha_1\beta_0) + \alpha_1\beta_2 X_{wt} + \alpha_1\beta_3 H_{wt} + \alpha_2 X_{ht} + \alpha_3 H_{ht} + \alpha_1\varepsilon_{wt} + \varepsilon_{ht}]$$
$$Y_{wt} = \frac{1}{1-\alpha_1\beta_1}[(\beta_0 + \beta_1\alpha_0) + \beta_1\alpha_2 X_{ht} + \beta_1\alpha_3 H_{ht} + \beta_2 X_{wt} + \beta_3 H_{wt} + \beta_1\varepsilon_{ht} + \varepsilon_{wt}]$$

Simplifying leaves us with the following system:

(3)
$$Y_{ht} = \delta_0 + \delta_1 X_{wt} + \delta_2 H_{wt} + \delta_3 X_{ht} + \delta_4 H_{ht} + \eta_{ht}$$
$$Y_{wt} = \gamma_0 + \gamma_1 X_{ht} + \gamma_2 H_{ht} + \gamma_3 X_{wt} + \gamma_4 H_{wt} + \eta_{wt}$$

Therefore, if we are estimate (1) ignoring the simultaneity at hand, our estimates will be biased. However, from the system described by (3) it is clear that we will be unable to identify the direct effect of the wife's (husband's) dependent variable on the husband (wife). However, we will be able to see how a wife's characteristics and health shocks affect a husband's dependent variable. Proper estimation of this model requires that we must use a methodology that allows for η_{ht} and η_{wt} to be correlated as specified in system (2). Intuitively, it would be very difficulty to separate shocks into those felt by a wife and those felt by a husband. For instance, it is plausible that shocks felt by one member of a household will have some affect on other members of the household. Therefore, we must use a methodology that accounts for this correlation.

IV. Data Section

The data for this study are from the Health and Retirement Study. Specifically, we use a version of these data created by Rand (RandHRS). RandHRS is a cleaned and streamlined version of the Health and Retirement Study (HRS) which was developed by Rand through grants from the National Institute on Aging (NIA) and the Social Security Administration (SSA). The dataset is a biennial national survey of individuals who were at least 51 years old in 1992 and their spouses. It includes detailed information on demographics, income, assets, health, cognition, family structure and connections, health care utilization and costs, housing, job-status and history, expectations and insurance for all individuals and their spouses. Collection of these data is intended to enable research in the areas of retirement, health, saving, insurance, and economic well-being. The RandHRS is based on the 1992, 1994, 1996, 1998, 2000, and 2002 waves of the HRS and offers derived variables covering a broad range of measures that are named consistently. The entire six-year panel of the RandHRS includes observations on over 22,000 households.

While the HRS is quite comprehensive, it does have some limitations. For instance, the only indication of residence is census division. This limitation prevents us from directly controlling for the effect of food prices and other state level variables on obesity levels because we these data, which vary primarily at the state level, to individuals. This omission is, however, unlikely to bias our results because this is unlikely to be correlated with short run changes in BMI and obesity levels at the individual level. Another limitation is the lack of data on nutrition and food consumption. This omission prevents us from estimating how a change in the nutrition or food consumption levels of a couple might influence the BMI, activity level or reduction of a husband's or wife's BMI level. Despite these shortcomings, the HRS is one of the most reliable and widely used data sets available for studying this age group.

Our individual and spousal measures of BMI level are continuous while the measures for individual and spousal reports of engaging in vigorous activity 3 or more times per week, an indicator of a report of an above normal BMI, and indicator of a reduction in BMI level are dichotomous variables. The indication of a reduction BMI is based on negative changes in BMI between two consecutive waves of data. The RandHRS survey also includes a variety of demographic and socioeconomic data that may be determinants of adult BMI levels and the probability of engaging in vigorous activity. Therefore, each equation in our analysis includes the following additional control variables: total household income; the age and age squared of the individual; age differences between the husband and his wife, indicators for race and ethnicity (African American, White, other including Hispanics); indicators for educational attainment (no degree, GED, high school, some college, and college).

Table 1 provides descriptive statistics for the individuals and spouses used in our analysis. Since we estimate a model of spousal BMI levels, our sample is limited to individual/spouse pairs that we for at least two years. In addition, we created variables regarding changes from the previous wave and, therefore, we must exclude the first year of data since it is impossible for us to calculate a change from the previous years that do not appear in the sample.

From Table 1 we see that the average BMI in the husband and wife samples is 27.2 and 26.8, very similar and in the above normal range. Furthermore, 70% of the husbands and 60% of the wives report having a BMI in the above normal range. On the brighter side, 58% of the husbands and 55% of the wives report having reduced their BMI in the past 2 years. From this analysis we are unable to why the report declines. In addition, table 1 illustrates that wives are slightly more active with 43% of the wives compared to only 38% of the husbands reporting vigorous activity in the past week.

V. Results

Recall we initially were interested in estimating how a wife's BMI level, declines in BMI and involvement in vigorous activity could impact their husband's BMI level, probability of experiencing a decline in his BMI or probability of participating in vigorous activity. However, due to the simultaneity in the determination of these variables for a husband and their wife, we are unable to estimate the direct impact that we seek. As a baseline, Table 2 provides the results of naively estimating these impacts without considering the possibility of simultaneity. While these results are biased, we offer them as a baseline.

From Table 2, we see that a husband's BMI level, probability of having an above normal BMI (Above Normal BMI), probability of experiencing a decline in his BMI (BMI Decline and probability of engaging in vigorous activity (Vigorous Activity) are all impacted by the variables that ex ante we might expect. For instance, lower education levels, high school education, some college or GED, are associated with higher BMI levels, and a higher probability of having an above normal BMI, when compared to having a graduate degree. In addition, lower education levels are associated with a lower probability of participating in vigorous activity.

A husband's health changes, also, exhibit interesting associations. Having a diagnosis of a stroke, cancer or lung disease in the past 2 years has a significantly negative impact on a husband's BMI level and probability of having an above normal BMI. These same variables are negatively impact the probability of participating in vigorous activity.

Another health diagnosis of interest is heart disease, while this diagnosis does not have any significant impact on most of the dependent variables of interest, it does have a negative and significant impact on the probability of experiencing a decline in the BMI.

Finally, the more interesting variables are those that give us a first look at how a wife may influence her husband. We have included age differences between the husband and the wife. From this variable, we see that the larger the age difference between the husband and his wife: 1) the less likely the husband is to have a high BMI level, 2) the less likely the husband is to have an above normal BMI and 3) the more likely the husband is to experience a decline in his BMI. We have also included the corresponding spousal variables for BMI levels, and indicators of above normal BMI, BMI decline, and participation in vigorous activity in the respective husband regressions. Recall that given that simultaneity exists between these variables for the husband and the wife, it is highly possible that these variables are upwardly biased. Therefore, these estimates should be considered an upper bound estimate. Keeping the potential for bias in mind, we do find that the wife's BMI level, probability of having an above normal BMI, probability of having experienced a decline in her BMI level and probability of participating in vigorous activity all have a highly positive and significant impact on the husband's BMI level, probability of having an above normal BMI, probability of having experienced a decline in his BMI level and probability of participating in vigorous activity, respectively. These results are consistent with evidence of spillover effects from a wife to her husband, but the results are potential biased.

While the results offered by Table 2 are interesting, from the policy perspective, they offer little information regarding the spillover effect. For instance, if a policy maker were to use these results, an implication would be, invoke a policy that causes women to experience a decline in their BMI. Since this BMI decline has a positive and significant influence on the probability that a husband will also experience a decrease in his BMI, we see that there are spillover effects. What is potentially more interesting is to determine which characteristics a wife has and which changes that the wife experiences have an impact on a husband. Therefore, this gives us more motivation to turn to the results offered by Table 3, the results that are estimated via the simultaneous model.

The set up for Table 3 requires some explanation. In column 1, the independent variables of interest are listed. The first 13 variables are the information regarding the husband. The second 13 variables are the information regarding wife. The last 2 variables are household level variables. These variables are included in the systems of equations for BMI levels (columns 2 and 3), Above Normal BMI (columns 4 and 5), BMI Decline (columns 6 and 7) and Vigorous Activity (columns 8 and 9). The even numbered columns provide the results for the husband's side of the system and the odd numbered columns provide the results for the wife's side of the system as specified by the equations described in system (3). For example, the variable lung disease (the 5^{th} variable listed) is the husband's report of a lung disease, the impact that this variable has on the BMI level of the husband (wife) is reported in the corresponding row in the 2^{nd} (3^{rd}) column.

Table 3 illustrates that there is positive correlation in the error terms specified for the couples as noted by the positive and significant estimate of the correlation parameter, rho. This provides further evidence that the spousal results offered in Table 2 are biased upward and should be considered upper bound estimates at best. In addition, given that the results in Table 3 allow for simultaneity we are unable to assess the direct impact of, say, a wife's BMI level on a husband's BMI level. Instead, we are able to determine the impact that a wife's (husband's) characteristics and certain changes in a wife's (husband's) health that impact her husband's (his wife's) BMI.

From Table 3 we find some interesting gender differences regarding how a wife responds to her husband's health shocks. For instance, when a husband experiences a stroke, the wife's probability of BMI decline increases, no other variable experiences a significant impact. The same does not hold for a husband, he does not experience a decline in his BMI as a result of the wife's stroke. In addition, a husband's diagnosis of high blood pressure positively and significantly affects a wife's BMI, probability of having an above normal BMI, and probability of participating in vigorous activity. Again, the same does not hold for a husband's response to a wife's diagnosis of high blood pressure. For a wife we find that she will experience, a decrease her BMI level, a reduction in the probability of reporting an above normal BMI, and an increase the probability of a BMI decline after her husband is diagnosed with heart disease. Meanwhile, after a wife's diagnosis of heart disease, the only response we see in her husband is that he is less likely to report an above normal BMI, there are no significant changes in his BMI level or reduction of his BMI.

In addition, husbands and wives are responsive to the educational levels of their spouse. The impact of education is the same for husbands and wives, the BMI levels and probability of above normal BMI of a husband (a wife) is positively related to a lower education level of the spouse. This could be due to poor knowledge of lower calorie food preparation techniques or the lack of knowledge regarding the poor effects of high BMI levels.

Finally, a husband's (wife's) BMI level and probability of having an above normal BMI are negatively (positively) related to the age difference between the couple. While the difference between the couple is positively (negatively) related to the husband (wife) experiencing a(n) decline (increase) in his (her) BMI. This suggests that marrying a younger woman has some protection effect on the male that does not translate to the females.

VI. Conclusions

Our paper considers the impact that spouses have on each other's BMI level, the probability of having an above normal BMI, the probability of experiencing a decline in their BMI and the probability of engaging in vigorous activity. We find, without allowing for simultaneity, that the spillover effects between these various measures of BMI and activity level are large. However, given that these results are potentially biased by the potential for positive correlation between these measures for a husband and his wife, we further our analysis by allowing for a simultaneously estimated system of equations.

The results from estimating the models as simultaneous systems suggest that there is positive correlation between the equations estimating a husband's and wife's BMI level and indicators of above normal BMI, reductions in BMI and participation in vigorous activity. In addition, we find that a husband and a wife's BMI level (and indicators of above normal BMI, reductions in BMI and participation in vigorous activity) responds differently to their spouse's characteristics and health changes. This suggest, that there are gender differences in the way a spouses responds to each other's changes in health and other characteristics.

In conclusion, our results suggest that literature seeking to estimate the effect of policies using data on the adult populations may be missing an important spill over effect of these policies. Our estimations suggest that not only may spillover effects exist but they are potentially important determinants of spousal behavior. Without estimating these important effects we may be missing important policy targets that could assist with further reductions in BMI and obesity levels.

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Table 1: Descriptive Statistics

Variable	Description	Husband	Wife
BMI	BMI (Weight in Kilograms / (Height in meters)2)	27.213	26.815
BMI Above Normal	BMI reported above 25 k/m2	0.704	0.600
BMI Declined	BMI Declined Between Two Waves (=1 if Yes)	0.538	0.554
Vigorous Activity	Reports Participating in Vigorous Activity at Least 3 Times a Week (=1 if Yes)	0.382	0.428
Stroke	Had a Stroke Between Two Waves (=1 if Yes)	0.017	0.011
High Blood Pressure	Diagnosed with High Blood Pressure Between Two Waves (=1 if Yes)	0.046	0.048
Cancer	Diagnosed with Cancer Between Two Waves (=1 if Yes)	0.029	0.016
Heart	Diagnosed with Heart Disease/Heart Attack Between Two Waves (=1 if Yes)	0.041	0.025
Lungs	Diagnosed with Lung Disease Between Two Waves (=1 if Yes)	0.017	0.013
Quit Smoking	Quit Smoking Between Two Waves (=1 if Yes)	0.025	0.017
Smoking Now	Smoke Now (=1 if Yes)	0.171	0.151
Age	Age Reported	65.244	61.293
Age Squared	Age Reported Squared	4340.812	3856.494
Household Income	Household Income	59826.39	59826.39
White	Reports being White (=1 if Yes)	0.859	0.856
Black	Reports being Black (=1 if Yes)	0.105	0.104
Hispanic	Report Ethinicity as Hispanic (=1 if Yes)	0.076	0.080
No Degree	Reports having no educational degree (=1 if Yes)	0.268	0.222
High School	Reports having a High School Education (=1 if Yes)	0.277	0.366
GED	Reports earning a GED (=1 if Yes)	0.052	0.040
Some College	Reports taking some College Classes (=1 if Yes)	0.031	0.038
College	Reports earning a College Degree (=1 if Yes)	0.121	0.097
Age Difference	The Difference in Husband and Wife's Age	3.951	
Both Vigorous Activity	Both Report Participating in Vigorous Activity at Least 3 Times a Week (=1 if Yes)	0.210	
Number of Obs.		26,602	

Table 2: Regression Results for a Husband without Simultaneity

	BMI		Above Normal BMI		BMI Decline		Vigorous Activity	
	Coefficient		Coefficient		Coefficient		Coefficient	
	Standard Error		*Standard Error*		*Standard Error*		*Standard Error*	
Stroke	-0.951	*	-0.013	*	0.335	*	-0.479	*
	0.220		*0.061*		*0.061*		*-0.068*	
High Blood Pressure	0.356	*	0.087	*	0.022		0.002	
	0.121		*0.038*		*0.037*		*-0.037*	
Cancer	-0.608	*	-0.089	**	0.221	*	-0.188	*
	0.166		*0.048*		*0.047*		*0.048*	
Heart Disease	-0.074		-0.024		0.251	*	-0.031	
	0.139		*0.040*		*0.040*		*0.040*	
Lung Disease	-1.176	*	-0.321	*	0.090		-0.441	*
	0.227		*0.060*		*0.061*		*0.066*	
Household Income	0.000	*	0.000	***	0.000	*	0.000	*
	0.000		*0.000*		*1.15E-07*		*0.000*	
White	0.594	*	0.224	*	0.116	*	0.063	
	0.301		*0.082*		*0.041*		*0.062*	
Black	0.448		0.191	*	0.168	*	-0.106	
	0.345		*0.093*		*0.047*		*0.070*	
Hispanic	0.430	*	0.121	*	0.017		-0.061	
	0.199		*0.060*		*0.030*		*0.042*	
No Degree	-0.114		0.087	*	0.053	*	-0.202	*
	0.146		*0.043*		*0.022*		*0.032*	
High School	0.338	*	0.157	*	-0.037	***	-0.044	
	0.135		*0.041*		*0.021*		*0.031*	
GED	0.413	***	0.188	*	0.023		-0.086	
	0.241		*0.070*		*0.034*		*0.051*	
Some College	0.931	***	0.177	**	-0.069		0.055	
	0.323		*0.090*		*0.043*		*0.067*	
College	-0.145		-0.013		-0.066	*	-0.050	
	0.161		*0.050*		*0.026*		*0.039*	
Age Difference	-0.047	***	-0.008	*	0.006	*	-0.002	
	0.009		*0.003*		*0.001*		*0.002*	
Spousal Variable	0.157	*	0.284	*	0.207	*	0.510	*
	0.010		*0.027*		*0.016*		*0.019*	
Constant	22.538	*	-1.704		-0.493	*	-0.295	
	0.398		*0.642*		*0.045*		*0.025*	

* Significant at 1% level.
** Significant at the 5% level.
***Significant at the 10% level.

Table 3: Regressions Accounting for Simultaneity

	BMI Coefficient *Standard Error*		Above Normal BMI Coefficient *Standard Error*		BMI Decline Coefficient *Standard Error*		Vigorous Activity Coefficient *Standard Error*	
	Husband	Wife	Husband	Wife	Husband	Wife	Husband	Wife
				Husband's Variables				
Stroke	-0.960 *	-0.097	-0.256 *	-0.038	0.355 *	0.105 ***	-0.458 *	0.062
	0.214	*0.267*	*0.061*	*0.062*	*0.062*	*0.062*	*0.066*	*-0.370*
High Blood Pressure	0.394 *	0.305 **	0.101 *	0.071 *	0.021	-0.007	0.020	0.085 *
	0.131	*0.163*	*0.039*	*0.037*	*0.038*	*0.038*	*0.037*	*0.037*
Cancer	-0.605 *	0.020	-0.147 *	0.075 ***	0.233 *	0.041	-0.190 *	-0.065
	0.165	*0.206*	*0.048*	*0.048*	*0.048*	*0.048*	*0.048*	*0.048*
Heart Disease	-0.141	-0.469 *	-0.098 *	-0.097 *	0.262 *	0.067 *	-0.028	-0.021
	0.139	*0.173*	*0.040*	*0.039*	*0.040*	*0.040*	*0.040*	*0.040*
Lung Disease	-1.111 *	0.445 ***	-0.335 *	0.059	0.100 ***	-0.031	-0.457 *	-0.123
	0.211	*0.263*	*0.060*	*0.062*	*0.062*	*0.062*	*0.066*	*0.063*
White	0.350 **	-1.156 *	0.023	-0.160 ***	0.073	-0.029	-0.027	-0.041
	0.189	*0.236*	*0.094*	*0.095*	*0.049*	*0.051*	*0.072*	*0.072*
Black	0.879 *	1.021 *	0.309	0.225	0.271 *	0.094	0.019	0.205
	0.370	*0.462*	*0.201*	*0.183*	*0.096*	*0.094*	*0.148*	*0.136*
Hispanic	0.689 *	0.145	0.291 *	0.104	-0.075	0.111 **	0.052	-0.104
	0.198	*0.247*	*0.106*	*0.103*	*0.054*	*0.058*	*0.078*	*0.079*
No Degree	0.179 *	1.482 *	0.057	0.277 *	0.060 *	0.063	-0.172 *	-0.123
	0.089	*0.111*	*0.047*	*0.046*	*0.025*	*0.025*	*0.035*	*0.036*
High School	0.478 *	0.868 *	0.170 *	0.041 *	-0.025	0.001	0.039	0.003
	0.079	*0.099*	*0.043*	*0.099*	*0.022*	*0.022*	*0.026*	*0.027*
GED	0.582 *	1.100 *	0.222 *	0.215 *	0.026	-0.025	0.004	-0.018
	0.135	*0.169*	*0.072*	*0.071*	*0.036*	*0.040*	*0.049*	*0.049*

Some College	1.183	*	1.484	*	0.256	*	0.250	*	-0.055		0.027		0.126	**	0.036	
	0.167		*0.209*		*0.094*		*0.086*		*0.045*		*0.047*		*0.066*		*0.062*	
College	-0.175	**	0.120		-0.003		-0.021		-0.066	*	-0.031		0.014		0.055	
	0.096		*0.037*		*0.051*		*0.050*		*0.026*		*0.028*		*0.037*		*0.037*	
Wife's Variables																
White	0.350		0.798	*	0.181	*	0.209	*	0.063		-0.023		0.101		0.039	
	0.189		*0.236*		*0.096*		*0.095*		*0.048*		*0.050*		*0.071*		*0.071*	
Black	0.879		1.855	*	-0.002		0.547	*	-0.091		-0.063		-0.151		-0.335	*
	0.370		*0.462*		*0.199*		*0.181*		*0.096*		*0.096*		*0.148*		*0.134*	
Hispanic	0.689		0.919	*	-0.067		0.232	*	0.093	**	-0.110	**	-0.144	**	-0.065	
	0.198		*0.242*		*0.105*		*0.102*		*0.053*		*0.057*		*0.077*		*0.080*	
No Degree	-0.090		0.165		-0.027		0.056		0.010		0.077	*	-0.107	*	-0.16	*
	0.095		*0.118*		*0.050*		*0.049*		*0.026*		*0.027*		*0.037*		*0.038*	
High School	0.046		0.216	*	0.052		0.088	*	-0.035	***	0.026		-0.004		-0.042	
	0.076		*0.095*		*0.041*		*0.039*		*0.021*		*0.022*		*0.030*		*0.030*	
GED	0.323	*	0.611	*	0.075	*	0.227	*	-0.079	*	-0.026		0.019		-0.040	
	0.150		*0.187*		*0.082*		*0.081*		*0.039*		*0.044*		*0.058*		*0.059*	
Some College	0.199		0.423	*	0.038		0.147	*	0.001		-0.004		0.108	**	0.031	
	0.152		*0.189*		*0.080*		*0.076*		*0.039*		*0.041*		*0.061*		*0.061*	
College	-0.173	***	-0.568		-0.073	***	-0.102	**	-0.005		0.018		0.075	**	0.049	
	0.105		*0.132*		*0.055*		*0.056*		*0.029*		*0.030*		*0.043*		*0.043*	
Stroke	-0.193		-0.189	*	-0.065		-0.075	*	-0.015		0.253	*	-0.072		-0.398	*
	0.261		*0.326*		*0.077*		*0.077*		*0.076*		*0.075*		*0.076*		*0.082*	
High Blood Pressure	0.146		0.471	*	0.000		0.177	*	0.018		0.012		0.002		-0.030	
	0.129		*0.162*		*0.037*		*0.037*		*0.038*		*0.037*		*0.036*		*0.037*	
Cancer	-0.548	*	-0.318		-0.118	*	-0.098		0.034		0.242	*	-0.035		-0.207	*
	0.220		*0.275*		*0.066*		*0.064*		*0.064*		*0.064*		*0.063*		*0.065*	
Heart Disease	-0.008		0.041		-0.097	*	-0.053		0.027		0.250	*	-0.008		-0.177	*

	0.176		*0.219*		*0.051*		*0.050*		*0.051*		*0.051*		*0.050*		*0.052*	
Lung Disease	0.070		-0.406	*	-0.022		0.056		0.080		0.025		-0.142	*	-0.406	*
	0.242		*0.077*		*0.073*		*0.072*		*0.071*		*0.071*		*0.073*		*0.077*	
							Household Variables									
Age Difference	-0.044	*	0.035	*	-0.014	*	0.004		0.004	*	-0.004	*	-0.002		0.007	*
	0.005		*0.007*		*0.003*		*0.003*		*0.001*		*0.001*		*0.002*		*0.002*	
Household Income	0.000	*	0.000	*	0.000	*	0.000		0.000	*	0.000	*	0.000	*	0.000	*
	0.000		*0.000*		*0.000*		*0.000*		*0.000*		*0.000*		*0.000*		*0.000*	
Constant	26.566	*	25.938	*	26.566	*	-0.083		-0.420	*	-0.256	*	-0.176	*	-0.225	*
	0.200		*0.250*		*0.200*		*0.105*		*0.054*		*0.055*		*0.080*		*0.079*	
Rho	---				0.198	*			0.119	*			0.308	*		
					0.016				*0.010*				*0.011*			

* Significant at 1% level.
** Significant at the 5% level.
***Significant at the 10% level.