Title:

DOES COVERAGE OF HEALTH INSURANCE CONTRIBUTE TO OBESITY?
AN EMPIRICAL STUDY AMONG AMERICAN YOUNG ADULTS*

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Abstract:

Purpose: The research question that this paper investigates is whether insurance status can influence preventative unhealthy behaviors (ex-ante moral hazard; see Ehrlich and Becker, 1972) and how that change (if there is any) in behaviors will contribute to body weights? We used body mass index (BMI) in the United States among young adults to answer this question.

Background: A major benefit of insurance is that the insured are more likely to avail themselves to routine physician visits and preventive services than the uninsured. For this and other reasons, most economists believe that health insurance has a positive effect on the health of the insured. Once insured, however, an individual may become less cautious about his health and more likely to engage in riskier activities than before. These two opposing effects of health insurance may be offsetting each other and the net effect of insurance on health may be positive or negative.

Data and Method: We extended the Ehrlich and Becker (1972) model of health behavior under the influence of health insurance to explain ex-ante moral hazard associated with a change in an individual’s health insurance status. We then apply the model to the BRFSS data from 2001-2011 for American young adults to estimate the relationship between health insurance and obesity. IV regression approach and Lewbel IV techniques were used to estimate the model after controlling for physician visits and other key endogenous variables such as health condition and employment status of the respondent.

Results: The results show that a mere switch from no health insurance to having insurance is associated with a decrease in BMI of 0.188 kg/m\(^2\); which means a weight loss of 1.33 pounds. However, generalization of such findings would be inappropriate because effects of having insurance do not have the same effect on BMI across all U.S. regions. In addition, health insurance is also associated with a decrease in 7.105 percentage points in the probability of being overweight and a reduction in the probabilities of 8.518 percentage points of being obese.
1. Introduction

As medical care advances and treatments increase, health care costs also increase. The purpose of health insurance is to help an individual to pay for care when he needs it the most. It protects him and his family financially in the event of an unexpected serious illness or injury that could be very catastrophic. In addition, he is more likely to avail routine visits and preventive care advice if he has health insurance. This implies that health insurance is a vital input in the production of good health. However, it is worthy to mention here that health insurance in not a system without flaws. There are several negative economic mechanisms are at play; out of which two most important and prevalent concepts are adverse selection and moral hazard.

First, adverse selection refers to the idea that insurance companies actually have a disincentive to offer the “best” health plans. Since, individuals buying comprehensive health insurance coverage are likely to be those who anticipate a greater need of health care, due to their greater health risk and pre-existing family history and those who do not suffer from health problems, such as younger populations, will avoid purchasing insurance or, if they do, will purchase only a basic health plan. This means in either case, insured individuals will not be non-random sample from the population. Second, the moral hazard mechanism in insurance sector works through two pathways, viz. ex-post and ex-ante. As it is generally known, ex-post moral-hazard is a consequence of health insurance: insurance coverage reduces the marginal price of care and induces additional consumption. More explicitly, individuals who are just indifferent between using and not using a certain medical service at uninsured rates will tend to use it if they have insurance. This is a direct price effect (ex-post moral hazard; see Ehrlich & Becker,
Ex-ante moral hazard refers to the idea where individuals once insured may become less cautious about their unhealthy behaviors or risky activities; that is, individuals may respond to their insurance status differently and change behaviors (ex-ante moral hazard; see Ehrlich & Becker, 1972), and thereby, they need more health care in the future.

The problems of moral hazard and adverse selection which reduces the efficiency in the health care market are inherent in the health insurance system as it stands today. Insurance companies often try to put in place plan mechanisms to counteract those problems. Like, to prevent adverse selection, these insurance plans often take the form of denying coverage to those with pre-existing conditions, not covering certain costly conditions, and limiting the amount they are willing to reimburse consumers for their expenses. Managed care and co-payments options are two most effective ways of dealing with ex-post moral hazard problem. However, it is hard for the insurance companies to control risky behavior of the insured in the future. This is where the problem of ex-ante moral hazard becomes particularly problematic. Moreover, this ex-ante moral hazard may be very bad from an individual’s health perspective. There are theoretical reasons (a model of insurance is provided in the later part of this paper to support this claim) to believe that health insurance coverage may cause a reduction in prevention activities but empirical studies have yet to provide sufficient evidence to support this prediction. One explanation for the lack of empirical evidence is that it is more difficult to detect ex-ante moral hazard in the health insurance context than in others because of the non-random nature of health insurance. In the presence of insurance, however, the incentives to
engage in health promoting behaviors are lessened as the costs incurred from being sick are lowered.

It can be concluded from above that individuals who do not have health insurance or lose health insurance have incentives to engage in preventative, health promoting activities; while those who have insurance and pay less out-of-pocket might just have the opposite reaction. The research question that this paper tries to investigate is whether the insurance status can influence preventative unhealthy behaviors (ex-ante moral hazard) and how that change (if there is a change) in behaviors will contribute to body weights? I will use body mass index (BMI) in the United States among young adults to answer this pertinent question.

Body weight and obesity are desirable outcomes to study because the weight may plausibly be affected by the availability of health insurance and the ex-ante moral hazard problem. The new health care law (Patient Protection and Affordable Care Act, 2010 or commonly known “Obamacare”) requires certain health insurance plans to offer free preventive services including weight loss counseling, which may have a positive influence on Americans' eating and exercise habits and lead to lower obesity levels. If the requirement that all Americans must purchase health insurance remains intact, these new preventive services could reach even more people-- particularly low-income Americans, who face the double burden of being among the most likely to be obese and to be uninsured. However, one caveat to note here is that the relationship between obesity and insurance can be confounded by the ex-post moral hazard problem if insurance coverage encourages people to visit the doctor and they receive and follow advice to lose weight (Dave & Kaestner, 2006). Moreover, most of the insurance companies do not treat
obesity as a disease\textsuperscript{1}, and thus the extent to which physician advice is given and followed is debatable. In order to eliminate the confounding effects of doctor advice, we restricted the sample to those young individuals who did not report a visit to a physician or medical professionals in the past one year or more.

The relationship between health insurance and obesity status is complicated by structural endogeneity and the potential influence of other confounding factors such as work status and income. To be more explicit, an individual with higher income is less likely to be obese yet more likely to have health insurance. Is it the case that these people would be even thinner had they no health insurance, as they would not discount the future heavily when they are without insurance?; or would they instead be heavier without health care, as medical services are believed to improve health outcomes? In this example, the net effect of health insurance on body weight is ambiguous. In general, existing theories regarding the production of health in the context of insurance may help guide predictions, but ultimately this is an empirical question. If health insurance has a causal negative influence on good health, then moral hazard may be a true concern. Yet if the opposite holds, this might lend further support for expanded or universal health insurance coverage due to the benefits that health insurance yields (Rashad & Markowitz, 2009).

First, a theoretical model of health insurance and health behavior was built to explain \textit{ex-ante} moral hazard in health insurance sector. Second, using data from the

\textsuperscript{1} In November of 2005, the Centers for Medicare & Medicaid Services proposed national Medicare coverage for bariatric surgery procedures. For more details, see the U.S. Department of Health and Human Services website at: http://www.cms.hhs.gov/apps/media/press/release.asp?Counter=1733
Behavioral Risk Factor Surveillance System (BRFSS) from 2001 to 2011, this study also empirically looked at the effect of a possession of health insurance on an individual’s body weight and obesity status. Typically, any regression models in empirical economic research suffer from at least one form of endogeneity bias but this paper tried to overcome the endogeneity issues by employing instrumental variable (IV) approach and Lewbel IV techniques (Lewbel, 2007).

The plan for the rest of the paper is as follows. Section 2 aims to present a brief overview of relevant literature. Section 3 sets up a standard theoretical model of health insurance and health behavior to explain ex-ante moral hazard. Data, econometric framework and identification issues in this research are presented in section 4. Section 5 explores various empirical findings. And finally, section 6 ends with concluding remarks.

2. Literature Review

The rapid increase in obesity rates is why it is now often called an epidemic and the health care costs that come with it have ballooned over the last two decades (The Global Health Regime, Issue Brief; April 23, 2013.), both scientific researchers and public health officials have given the issue more attention and energetically seek to answer- two closely related questions, i.e., what is causing it, and how can we reverse it? While a lot of social and economic factors that might contribute to become obese have long been studied, there is a dearth of health economics literature that looked into the role played by possession of health insurance in changing preventive behaviors among young American adults. Most existing literature on health insurance effects examines the reduced form effect of health insurance effect on medical utilization (Savage & Wright, 2003; Zweifel & Manning, 2000). These studies do not consider the impact of having
health insurance on individual health behaviors, and how that might affect their medical utilization. Below is an illustration of this literature in relation to the focus of my paper.

While a great deal of research shows that health insurance results in increased use of health care, there is little evidence that having health insurance leads to improved health (Haas, Udvarhelyi, & Epstein, 1993a, 1993b; Perry & Rosen, 2001). From the RAND Health Insurance Experiment, Newhouse (1993) examines the differences in BMI, levels of physical activities, smoking, and alcohol consumption among individuals enrolled in cost sharing insurance plans and free plans. The results show no difference in these behaviors between these two groups. Although ex-ante moral hazard is nearly always mentioned as a potential consequence of health insurance, it is equally as often noted that ex ante moral hazard is unlikely to be a significant problem. But Kenkel (2000), Zweifel and Manning (2000) showed why it is important. Again, Courbage and Coulon (2004) examined the ex-ante moral hazard question using probits and an instrumental variables strategy, and found that having secondary insurance does not reduce preventative efforts and in fact, may increase them. However, given that all residents are covered by the national insurance in England, these results are not surprising. Their analysis essentially tests the speed of receiving care, not the presence of or generosity of insurance.

In addition, Kenkel (2000) finds little evidence of a moral hazard effect in his analysis of individual behaviors using the 1990 National Health Interview Survey. His analysis suggests that people with private health insurance are more likely to engage in health promoting behaviors than those who do not have insurance, with one exception that men with insurance are more likely to be obese. Moreover, Dave and Kaestner
(2006) extended the analysis of the effect of health insurance on health behaviors by allowing for the possibility that health insurance has a direct (ex-ante moral hazard) and indirect effect on health behaviors. They identify these two effects and in doing so identify the pure ex ante moral hazard effect. Their study exploits the plausibly exogenous variation in health insurance as a result of obtaining Medicare coverage at age 65. They find evidence that obtaining health insurance reduces prevention and increases unhealthy behaviors among elderly men and also find evidence that physician counseling is successful in changing health behaviors. Again, Battacharya and Packalen (2008) tested the proposition that body weight is influenced by insurance coverage - using two approaches. Using Rand Health Insurance Experiment data and instrumental variable approach, they find weak evidence that more generous insurance coverage increases body mass index and strong evidence that being insured increases body mass index and obesity.

Card, Dobkin, and Maestas (2008) used the discrete changes generated by the rules of the Medicare program to identify the impact of health insurance on access to care and utilization. They find that the onset of Medicare eligibility leads to increases in the use of medical care services, with a pattern of gains across groups that varies with the type of service. Routine doctor visits and access to care increase more for groups that previously lacked coverage, and experience the largest gains in coverage at age 65 and overall hospitalizations increase sharply, but the patterns of gains across groups differ by type of admission. Again, Bhattacharya, Bundorf, and Sood (2009) using the data from Rand Health Insurance Experiment concluded that health insurance does indeed make you fat. The results indicate that private insurance increases BMI by 1.3 points and public
insurance increases BMI by 2.1 points. Both these effects are quite large and are precisely estimated.

This paper adds to this current literature by examining the potential for an *ex-ante* moral hazard using recent data for American young adults (18-24 years) from Behavioral Risk Factor Surveillance System (BRFSS) during 2001-2011. While a randomized nature of RAND experiment (Newhouse, 1993) may be the ideal sample design, those data were collected much earlier than the large rise in body weights seen today and the results may no longer be applicable. Kenkel (2000) is worried about endogeneity in his study, but this research paper discusses to overcome the problem by employing instrumental variable (IV) approach and Lewbel IV techniques. Card et al. (2008) examine the behavior of the elderly (65 and above) but in contrast, this paper analyses the behavior of young American adults of 18-24 years of age group. Major findings of this paper are opposite with the findings of Kenkel (2000), Card et al. (2008) and Rashad et al. (2009) that having health insurance is positively associated with BMI. This paper estimated that a switch from no health insurance to having health insurance is associated with a decrease in BMI of 0.188 kg/m² which means a weight loss of 1.33 pounds. The possession of health insurance is also associated with a decrease in 7.105 percentage points in the probability of being overweight and a reduction the probabilities of 8.518 percentage points of being obese. The results are pretty robust and statistically significant.
3. Theoretical Model

The theoretical motivation of this study is a straightforward application of the Ehrlich and Becker (1972) model of the demand for self-protection (prevention). Following directly from Becker and Ehrlich (1972), we assume for simplicity that an individual is faced with only two states of the world (0 = sick, 1 = healthy) with probabilities p and (1- p) respectively and that his health endowment in each state is given with certainty by H_1 and H_0; where (H_1 - H_0) = L is the prospective health loss if state 0 occurs. Let’s assume that the probability of a loss of health endowment is \( p(e) \) where \( e \) is the effort expended and \( p'(e) < 0 \). An expected utility maximizer will optimize the following function:

\[
EU = U^* = \max_e \{ [1 - p(e)] * U(H_1 - e) + p(e) * U(H_0 - e) \}
\]

\[
\Rightarrow U^* = \max_e \{ [1 - p(e)] * U(H_1 - e) + p(e) * U(H_1 - L - e) \} \quad (1)
\]

Maximizing consumer utility with respect to \( e \) yields the first order condition \([FOC(e)] \):

\[
-p'(e) * U(H_1 - e) - (1 - p) * U'(H_1 - e) + p'(e) * U(H_1 - L - e) - p * U'(H_1 - L - e) = 0
\]

\[
\Rightarrow p'(e) * [U(1) - U(0)] = p(e) * [U'(0) - U'(1)] + U'(1) \quad (2)
\]

Where \( U(1) = U(H_1 - e) \) and \( U(0) = (H_1 - L - e) \). Equation (2) is the usual marginal benefit equal to marginal cost equilibrium condition. Ehrlich and Becker (1972) noted that “[t]he term on the left is the marginal gain from the reduction in \( p \); that on the right, the decline in utility due to the decline in both incomes, is the marginal cost.” The benefit
of prevention is the increase in utility resulting from the decline in the probability of
becoming ill; endowment in the healthy state is higher than endowment in the sick state,
so a decrease in the probability of becoming sick increases utility. The cost of prevention
is the reduction in utility as a result of expenditures on prevention.

Let’s now introduce health insurance into our model in a way that will illustrate
the effect of insurance on individuals’ behaviors. An insurance policy can simply be
described by a premium \( \pi \geq 0 \) and level of coverage \( s \geq 0 \). For convenience, let’s assume \( \pi \)
and \( s \) are not random. However, it is possible (but we would say, only a theoretical
curiosity) that randomness might be desirable. If an individual decides for some reason to
purchase a health insurance policy \((s, \pi)\), he then chooses effort level \( e \) to maximize his
new expected utility function and the new objective function would become:

\[
U^* = \max_{s, \pi} \{ (1 - p(e)) \cdot U(H_1 - e - s \cdot \pi(e)) + p(e) \cdot U(H_1 - L - e - s) \}
\]

Here, \( s \) is the insurance benefit and \( \pi(e) \) is price of the insurance; \( s \cdot \pi(e) \) is the
insurance premium. Assume: \( U(1) = U(H_1 - e - s \cdot \pi(e)) \) & \( U(0) = U(H_1 - L - e - s) \)
and the first order conditions now become:

**FOC(s):**

\[
(1 - p) \cdot U'(1) + p \cdot U'(0) = 0
\]  

**FOC(e):**

\[
-p'(e) \cdot [U(1) - U(0)] - (1 - p)(1 + s\pi'(e)) \cdot U'(1) - p \cdot U'(0) = 0
\]
Ex-ante moral hazard arises because health insurance reduces the income difference between the healthy and sick states and therefore, reduces the benefits of investment in prevention. A consumer who is fully insured \([s = (H_1 - H_0) = L]\) would receive no benefits from prevention and therefore not invest in prevention\(^2\). However, if insurance companies are actually able to measure self-protection and can price insurance accordingly, then individuals will have some incentive to increase prevention in order to lower their insurance premiums. If insurance is priced in an actuarially fair manner (i.e. \(\pi = \frac{p(e)}{1-p(e)}\)), we can show that premiums will drop when self-protection increases:

\[
\frac{d\pi}{de} = \frac{p'}{(1-p)^2} < 0.
\]

As equation (4\(^{'}\)) indicates, consumer prevention efforts depend on the productivity of prevention \(\frac{dp}{de}\) and the probability of illness \((p)\). Insurance may affect both of these determinants. Specifically, insurance is associated with an increase in physician visits and this increase in physician contact may influence prevention activities. Numerous studies (Mundt, French, Roebuck, Manwell, & Barry, 2005; Whitlock, Michael, Carla, Tracy, & Jonathan, 2004; Elley, Keres, Arroll, & Robinson, 2003; Bull & Jamrozik, 1998; Doescher & Saver, 2000; Young & Ward, 1998; Frank, Winkleby, Altman, Rockhill, & Fortmann, 1991; Dave & Kaestner, 2006; Kant & Miner, 2007; Loureiro, Gracia, & Nayga, 2006) have shown that physician advice and interventions are successful in influencing patient behaviors.

\(^2\) According to Ehrlich and Becker “On the one hand, self-protection is discouraged because its marginal gain is reduced by the reduction of the difference between the incomes and thus the utilities in different states, on the other hand, it is encouraged if the price of market insurance is negatively related to the amount spent on protection through the effect of these expenditures on the probabilities.”
We can incorporate these ideas into the analysis by making the marginal product of prevention effort and the probability of illness a function of physician contacts ($c$), which itself is a function of insurance ($s$):

$$c = c(s) \text{ and } p = p(e, c(s))$$

$$\frac{dp}{de} = \frac{dp}{ds}(c(s))$$

So, equation $(4')$ becomes:

$$-\frac{dp}{ds}(c(s))[U(1) - U(0)] - (1 - p(e, c(s)))(1 + s\pi'(e)) * U'(1) - p(e, c(s)) * U'(0) = 0$$

It is interesting to note here that the effect of insurance coverage ($s$) on preventive effort ($e$) can be represented as:

$$\frac{de}{ds} = -\frac{d[FOC(e)]}{ds}/SOC(e)$$

Note here that $SOC(e)$ is the second order condition with respect to $e$, which is negative by assumption. Thus, the sign of the effect of insurance on prevention is the same as the sign of $\frac{d[FOC(e)]}{ds}$ in equation (7), that is:
\[
\frac{d[FOC(e)]}{ds} = \frac{d^2p}{ddec} \frac{dse}{ds} \left[ U(1) - U(0) \right] - \frac{dp}{de} \left[ \pi(e) * U'(1) - U'(0) \right] - \frac{p * U''(0)}{3} - \\
\frac{dp}{dc} \frac{dc}{ds} \left[ U'(0) - \left\{ 1 + s * \pi'(e) \right\} * U'(1) \right] \\
- \left( 1 - p \right) \left[ \pi'(e) * U'(1) - \pi(e) \left\{ 1 + s * \pi(e) \right\} U''(1) \right] 
\] (8)

Given all the studies in relation to the effect of physician’s intervention, it is reasonable to assume that physicians can raise the marginal product of prevention \( d^2p/ddec < 0 \) and that physician’s effect on the probability (perception) of illness is ambiguous \( dp/dc = \frac{>0}{<0} \). Thus, the first term on the right-hand side of the equation (8) is positive, which indicates that insurance increases prevention because physician contacts improve the productivity of investments in prevention. The second term is negative and is the pure \textit{ex-ante} moral hazard effect—insurance reduces the value of investments in prevention because it raises income in the sick state. The third term is positive—prevention is increased because insurance lowers the marginal cost of prevention by providing more income in the sick state. The fourth term may be positive or negative and depends on whether physician visits reveal that a person is healthier or sicker than expected. The fifth term is negative—if price of insurance and thus premium is increased from an initially fair level, the demand for self-protection and market insurance will decrease.

To summarize, empirical analyses of the effect of health insurance on health behaviors (\textit{ex-ante} moral hazard) need to account for changes in a person’s information set that may occur as a result of insurance, most notably changes in information that are
likely to occur because of greater receipt of medical services. Similarly, there is significant evidence that physicians are successful at changing lifestyle behaviors. So, insurance may reduce prevention because of traditional arguments related to ex-ante moral hazard, but investigations of this effect may not uncover this behavior because of potentially offsetting effects caused by greater interaction with the medical system. Here, we will separate out these two effects in the context of young adults (18-24 years old) who have health insurance using relevant empirical strategy.

4. Empirical Strategy

First, linear regression approach will be used to obtain estimates of the effect of insurance on BMI utilizing cross-sectional data on a sample of individuals aged between 18 to 24 years from the Behavioral Risk Factor Surveillance System (BRFSS) during the period 2001-2011. The sample was limited to 18-24 age groups because the time preference of these individuals may make their incentives and outcomes varies differently than older adults and moreover, they are the future of U.S. labor force and moreover, we did not come across any study particularly limited to this group of young individuals. But any prediction of the effect of health insurance on obesity status (here BMI) must be made with caution because of the possibility of ex-post moral hazard. If insurance coverage encourages people to visit the doctor and they receive and follow advice to lose weight (Dave & Kaestner, 2006), an inverse relationship is evident. However, most of the insurance companies do not treat obesity as a disease, and thus the extent to which physician advice is given and followed is debatable. Again, studies by Wee, McCarthy, Davis, and Phillips (1999), Clark (1991) and Ammerman, DeVellis, Carey, Keyserling, Strogatz, et al. (1993) find little or no evidence of the minimal effectiveness of physician
counseling. Nevertheless, to make sure that ex-post moral hazard of health insurance is not confounding my empirical findings, we limited our data set to only those individuals who did not visit doctors in the past one year or more, although they had health insurance to eliminate the possibility of endogeneity issues.

According to Grossman (1972), there are always issues of endogeneity which even complicates the estimation further. For example, those who are obese are more likely to have certain illnesses or to seek insurance against their potential future maladies. Alternatively, obese persons may have a time preference for the present (or discount the future more heavily than non-obese persons) and choose not to have insurance. An instrumental variable (IV) regression approach and Lewbel IV (Lewbel, 2007) techniques will be used to avoid these confounding effects. The simple regression that we are most interested in, like, Rashad et al. (2009) is of the following form:

\[(BMI)_i = \alpha_0 + \alpha_1 (Ins)_i + \alpha_2 X_i + \alpha_3 U_i + \epsilon_i \]  

(9)

Here, \(i\) denote individual observations, \(BMI\) represents one of the three measures of weight (will be discussed later). \(Insurance\) is a dichotomous indicator of any form of health insurance. \(X_i\) represents the vector of other relevant variables such as the probability of illness, the potential monetary loss from illness, labor supply, and wages. As discussed below, some measures of income and education are included, but unfortunately, some of the variables that are important in the theoretical model are not available in the existing data sets. While demographic and socioeconomic variables will help control for some of these unobserved factors, the authors recognize that many of
these factors will remain unobserved in the error term. However, another potential problem to consider when health insurance status is determined by weight:

\[(\text{Ins})_i = \beta_0 + \beta_1 (\text{BMI})_i + \beta_2 X_i + \beta_3 F_i + \beta_4 U_i + \varepsilon_2\]  

(10)

In equation (10) the variables are the same as in equation (9) and \(F_i\) represents variables that predict health insurance status but not body weight. Given this, a simple estimation of equation (9) will yield a biased estimate of the coefficient on health insurance if there are common unobservable factors \((U_i)\) influencing both weight \((\alpha_3 \neq 0)\) and health insurance \((\beta_4 \neq 0)\), which is analogous to an omitted variable bias, or if weight is a determinant of health insurance status \((\beta_1 \neq 0)\). The estimation techniques attempt to address all of these sources of endogeneity. First, empirically equation (9) is estimated using a pooled cross-section of individuals over time. The goal is to obtain a consistent estimate of the effect of health insurance on measures of body weight. Assuming that we are able to avoid the problems of endogeneity, a positive coefficient is indicative of the presence of \textit{ex-ante} moral hazard; that is, having health insurance leads to unhealthy behaviors that contribute to larger body weights. A zero or negative coefficient will indicate the absence of any \textit{ex-ante} moral hazard effect.

We used a variety of techniques to address the problems of endogeneity of health insurance in the body weight equation and ultimately relied on instrumental variable (IV) techniques to draw final conclusions. However, restrictions on the sample help minimize the influence of confounding factors. However, restrictions on the sample limit the generalizability of our empirical findings.
Following Rashad et al. (2009), the first restriction on the sample is that it is limited to employed individuals only. This restriction is useful because it helps limit the amount of unobserved heterogeneity that may be correlated with the body weight measures and insurance status. The provision of health insurance is tied intimately to the U.S labor market and those who are unemployed may have very different characteristics and incentives than employed individuals. Also, this restriction has been required for the instruments that we will be using, the percentage of each state’s workforce employed in firms of different size (100-499 and 500+ employees), works theoretically only for individuals who are employed. The second restriction limits the sample to those individuals who are classified as “healthy” and who have not visited the doctor in the past year even if they have insurance. Healthy individuals are defined as those who report that their general health is very good or excellent, and they do not report diabetes, high cholesterol, or any heart problems. The healthy sample is considered because this is a group for which reverse causality, or structural endogeneity, is less likely to be issues since healthy persons are unlikely to purchase insurance for health reasons. Limiting the sample to those who have not visited the doctor in the past one year or more is important in order to ensure that the estimated coefficients measure the ex-ante rather than the ex-post moral hazard. In other words, we hope to eliminate the possibility that insurance coverage lowers body weight. This would occur if insurance encourages doctors’ visits that lead to treatment and advice regarding weight loss practices.

When BMI is the dependent variable [equation(9)], OLS is used for the baseline model, followed by a two-stage least squares (2SLS) model with the percentage of each

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3 The author realizes that this is not a perfect stratification, as respondents may not fully be aware of their health status if they have not seen a doctor in the year prior to being interviewed.
state’s workforce employed in firms of sizes 100-499 employees and 500+ employees. These annual workforce data come from the U.S. Small Business Administration. Firm size is a useful instrument on a theoretical basis, as health insurance is strongly tied to employment in the United States, and firm size is a known predictor of whether health insurance is offered to employees, with individuals in large firms more likely to have health insurance (Fronstin, 2006). The coefficient in the first stage is positive, and the F-statistic value on their joint significance is 10.24 which is significant and higher than the well accepted Bound, Jaeger, and Baker (1995) value of 10.

Typically, regression models in empirical economic research suffer from at least one form of endogeneity bias. Endogeneity bias plagues empirical research. However, there are solutions, the most common being instrumental variables (IVs). Unfortunately, the exclusion restrictions needed to justify the use of traditional IV methodology may be impossible to find. According to Lewbel (2007), it is possible to overcome the endogeneity problem without the use of a traditional IV approach. Lewbel’s paper demonstrates how higher order moment restrictions can be used to tackle endogeneity in triangular systems. Without going into too much detail (for more details; see, Lewbel, 2007), Lewbel IV method is like the traditional two-stage instrumental variable approach, except the first-stage exclusion restriction is generated by the control, or exogenous, variables which we know are heteroskedastic (interested practitioners can test for this in the usual way, i.e., a White test or Breusch-Pagan test). A Breusch-Pagan (1979) test confirms that this heteroskedasticity is present in my model. The model can be re-estimated either by 2SLS or GMM, and the usual tests for the validity of the instruments can be applied. We tried both estimation procedures and the results are nearly identical,
so the 2SLS are reported in the tables. Earlier, Sabia (2007) used Lewbel IV and finds that the Lewbel IV results turn out to be more reliable than the TSLS results that rely on instruments of questionable validity.

When the dichotomous indicators of weight are considered (obese only, overweight only), probit model estimates provide baseline and bivariate probits are used to account for the endogeneity of health insurance. Identification can be achieved in the bivariate probit without external instruments, although we are cautioning here that this only works well when the distribution assumption of error terms are correct (Monfardini & Radice, 2007).

Eleven years of individual-level data from the Behavioral Risk Factor Surveillance System (BRFSS) are used for this empirical analysis. The BRFSS is a state-based system of health surveys coordinated by the Centers for Disease Control and Prevention to collect uniform information on risky behaviors, preventive practices, and health care access and usage. The interviews are of adults 18 years of age and older, and are based on a multi-stage stratified random sampling of telephone numbers. By 1994 all states and the District of Columbia were participating in the BRFSS. The present analysis thus utilizes data from the years 2001 through 2011. One advantage of the BRFSS is its large sample size. The empirical models are restricted to young adults between the ages of 18 and 24 years. With all the restrictions imposed earlier, the sample size for this empirical study becomes 15,169.

Information on self-reported body weight and height are available in all years of data as well as Body Mass Index (BMI) are also reported these days in the data set. BMI is defined as weight in kilograms divided by height in square meters, and it is the
measure that the National Institutes of Health use to track obesity over time. The dichotomous indicator of obesity is equal to 1 for an individual with a BMI \( \geq 30 \text{ kg/m}^2 \) is calculated. Also, a dichotomous indicator of being overweight only – i.e. \( 25 \leq \text{BMI} \leq 30 \), anyone who is recorded as obese is excluded from the analysis so the comparison is overweight versus normal or underweight can be computed.

The BRFSS data also include information on personal characteristics. Health insurance is measured by a dichotomous indicator for whether or not the individual has any kind of health care coverage, be it from private or public sources. Other personal characteristics include the following variables: age and age squared; gender; race or ethnic category as represented by indicators for white (the omitted reference category), Black, Hispanic, and other race; level of education as represented by dichotomous indicators for less than high school (the omitted reference category), some high school, high school degree, and college degree; family income and income squared; marital status; and the number of children under 18 in the household, food habit, excise, sleep deficiency, etc.

To give a little idea of how the percentages of insured young adults look like, follow graph 1. It shows the percentage of people with insurance and rate of obese/overweight young American people. Just by looking the relationship, it seems to be ambiguous. Then it is all left to test empirically whether there are any exact relationship between health insurance and BMI.
Graph 1: Percentage of Obese/Overweight Adults with Insurance during 2001-2011

5. Empirical Findings

Table 1 shows sample means for the full sample as well as separately for those individuals who are with and without health insurance. The measures of body weight (BMI category) show a statistically significant difference in values for those with and without health insurance; with those having insurance shows a lower BMI and less likely of being classified as overweight compared to their uninsured counterparts. It is not surprising that the table of means also shows that people with health insurance are more educated, are older, are married and have more children (statistically not significant), likely to engage in physical activity/exercise and have higher incomes than those without health insurance. Having insurance individuals is less likely to engage in smoking and drinking habits. However, possession of insurance does not influence their fruits and vegetable intake.
Table 1: Descriptive Statistics of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description of Variable</th>
<th>All Respondent N=15,169</th>
<th>Without Insurance N=4,994</th>
<th>With Insurance N=9,949</th>
<th>Difference in Means (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>Body mass index, measured as weight divided by height in meters</td>
<td>24.74 (3.94)</td>
<td>25.03 (7.23)</td>
<td>24.59 (4.68)</td>
<td>0.0000</td>
</tr>
<tr>
<td>Over-weight</td>
<td>Dichotomous variable that equals 1 if BMI equal to or greater than 25 but less than 30 kg/m²</td>
<td>0.275 (2.26)</td>
<td>0.279 (3.90)</td>
<td>0.272 (2.77)</td>
<td>0.0896</td>
</tr>
<tr>
<td>Obese</td>
<td>Dichotomous variable that equals 1 if BMI equal to or greater than 30 kg/m²</td>
<td>0.128 (9.45)</td>
<td>0.141 (16.68)</td>
<td>0.122 (11.27)</td>
<td>-</td>
</tr>
<tr>
<td>Insurance</td>
<td>Dichotomous variable that equals 1 if respondent has some form of health coverage</td>
<td>0.656</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>Age (year) of the respondent</td>
<td>21.76 (0.015)</td>
<td>21.71 (0.026)</td>
<td>21.79 (0.019)</td>
<td>0.0038</td>
</tr>
<tr>
<td>Male</td>
<td>Dichotomous variable that equals 1 if respondent is male</td>
<td>0.58</td>
<td>0.62</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>Dichotomous variable that equals 1 if respondent is married</td>
<td>0.184</td>
<td>0.154</td>
<td>0.202</td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td>No of children under 18 years old in the household</td>
<td>0.633 (0.008)</td>
<td>0.725 (0.015)</td>
<td>0.581 (0.009)</td>
<td>0.0000</td>
</tr>
<tr>
<td>High School</td>
<td>Dichotomous variable that equals 1 if completed exactly 12 formal schooling</td>
<td>0.44</td>
<td>0.58</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Some College</td>
<td>Dichotomous variable that equals 1 if completed 13 yrs. and &lt;16 years of schooling</td>
<td>0.34</td>
<td>0.31</td>
<td>0.36</td>
<td></td>
</tr>
<tr>
<td>College Graduated</td>
<td>Dichotomous variable that equals 1 if graduated from college respondent</td>
<td>0.21</td>
<td>0.11</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>Dichotomous variable that equals 1 if respondent is black but not Hispanic</td>
<td>0.0089</td>
<td>0.138</td>
<td>0.064</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>Dichotomous variable that equals 1 if respondent is Hispanic</td>
<td>0.101</td>
<td>0.142</td>
<td>0.079</td>
<td></td>
</tr>
<tr>
<td>Other Race</td>
<td>Dichotomous variable that equals 1 if respondent is not white, black, or Hispanic</td>
<td>0.045</td>
<td>0.059</td>
<td>0.039</td>
<td></td>
</tr>
<tr>
<td>Income1</td>
<td>Dichotomous variable that equals 1 if income is less or equal to $20,000</td>
<td>0.22</td>
<td>0.32</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Income2</td>
<td>Dichotomous variable that equals 1 if income is greater or equal to $20,000</td>
<td>0.78</td>
<td>0.68</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>Drinks</td>
<td>Dichotomous variable that equals 1 if respondent ever a binge drinker</td>
<td>0.54</td>
<td>0.56</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Smokes</td>
<td>Dichotomous variable that equals 1 if respondent smokes regularly / sometimes</td>
<td>0.25</td>
<td>0.35</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Dichotomous variable that equals 1 if respondent do some physical activity/exercise</td>
<td>0.84</td>
<td>0.80</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Fruits &amp; Vegetables</td>
<td>Dichotomous variable that equals 1 if respondent eats fruits and vegetables regularly</td>
<td>0.46</td>
<td>0.45</td>
<td>0.46</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Standard errors are in parenthesis, † denotes mean of BMI if 25 ≤ BMI < 30 and ‡ denotes mean of BMI if BMI ≥ 30, White is base category for race, school education is base category for education.
Table 2: Effects of Health Insurance on BMI

<table>
<thead>
<tr>
<th>Variable</th>
<th>OLS Estimate</th>
<th>IV Estimate</th>
<th>Lewbel IV Estimate without Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>-0.171* (0.096)</td>
<td>-0.1721**(0.095)</td>
<td>-0.188**(0.091)</td>
</tr>
<tr>
<td>High School</td>
<td>-0.064 (0.1830)</td>
<td>-0.460 (1.8290)</td>
<td>-0.156 (0.1441)</td>
</tr>
<tr>
<td>Some College</td>
<td>-0.186 (0.1761)</td>
<td>-0.290 (0.3530)</td>
<td>-0.209* (0.1661)</td>
</tr>
<tr>
<td>College</td>
<td>-0.127*** (0.056)</td>
<td>-0.517*** (0.251)</td>
<td>-0.509*** (0.244)</td>
</tr>
<tr>
<td>Age</td>
<td>0.013*** (0.005)</td>
<td>0.0123** (0.0063)</td>
<td>0.013*** (0.0051)</td>
</tr>
<tr>
<td>Age Squared</td>
<td>-0.0002 (0.0001)</td>
<td>-0.00027* (0.0001)</td>
<td>-0.0002* (0.0001)</td>
</tr>
<tr>
<td>Black</td>
<td>1.231** (0.616)</td>
<td>1.298 (0.653)</td>
<td>1.288*** (0.616)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.693*** (0.159)</td>
<td>0.538*** (0.146)</td>
<td>0.639*** (0.154)</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.386 (0.249)</td>
<td>-0.165 (0.239)</td>
<td>-0.300* (0.167)</td>
</tr>
<tr>
<td>Male</td>
<td>0.983*** (0.448)</td>
<td>0.975*** (0.4884)</td>
<td>1.002*** (0.480)</td>
</tr>
<tr>
<td>Children</td>
<td>0.188*** (0.0046)</td>
<td>0.174*** (0.0459)</td>
<td>0.174*** (0.045)</td>
</tr>
<tr>
<td>Income1</td>
<td>0.0458* (0.0262)</td>
<td>0.0457*** (0.022)</td>
<td>0.009** (0.0048)</td>
</tr>
<tr>
<td>Income2</td>
<td>-0.044** (0.0227)</td>
<td>-0.0617*** (0.0223)</td>
<td>-0.0606*** (0.0303)</td>
</tr>
<tr>
<td>Married</td>
<td>0.317*** (0.1121)</td>
<td>0.312** (0.1600)</td>
<td>0.311*** (0.1470)</td>
</tr>
<tr>
<td>Drinks</td>
<td>0.01431 (0.0953)</td>
<td>0.0157* (0.0094)</td>
<td>0.0147** (0.0078)</td>
</tr>
<tr>
<td>Smokes</td>
<td>-0.0314*** (0.012)</td>
<td>-0.0307*** (0.0115)</td>
<td>-0.0333** (0.0167)</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>-0.255*** (0.119)</td>
<td>-0.316*** (0.1190)</td>
<td>-0.314*** (0.123)</td>
</tr>
<tr>
<td>Fruits &amp; Vegetables</td>
<td>-0.276 (0.2640)</td>
<td>-0.184 (0.2330)</td>
<td>-0.199* (0.109)</td>
</tr>
</tbody>
</table>

Observations

<table>
<thead>
<tr>
<th>N=15,169</th>
<th>N=15,169</th>
<th>N=15,169</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-test on Instruments</td>
<td>10.24 [0.000]</td>
<td>1598.96 [0.000]</td>
</tr>
<tr>
<td>Hausmen test</td>
<td>29.51 [0.051]</td>
<td>53.94 [0.000]</td>
</tr>
</tbody>
</table>

Note: Absolute values of standard errors are in parentheses, p-values in brackets, and intercept not shown. Models also include state indicators, year indicators. Instruments are the percent of the workforce in firms of sizes 100-499 and 500+. * implies significant at 10%; ** implies significant at 5%; *** implies significant at 1%.
Table 2 shows the regression results for BMI. The first column is the baseline OLS model. The second column uses a 2SLS approach with the percent of the states’ workforces in firms of different sizes as instruments. The value of F-test as well as Hausman test corroborates that our instrument is a valid and strong one. Column 3 presents results from the Lewbel IV with no external instruments. The coefficient on having a health plan is negative in all the regression approach, and is statistically significant in the OLS (at 10 % level), IV (at 5% level) and Lewbel IV (at 1% level) models. Although percentage of the U.S. states’ workforces in firms of different sizes is a valid and strong instrument, a Lewbel IV approach appears to perform well (Sabia, 2007). The instruments have strong first stage F-statistics, pass the over-identification test, and the Hausman test also accept the consistency of the IV regression coefficients. The magnitude of the Lewbel IV coefficient is not sensitive to the inclusion of the external instruments (which is not surprising given their low predictive power and that make me not to report it), and indicate that a switch from no health insurance to having health insurance is associated with a decrease in BMI of 0.188 kg/m². To make it more plausible, let’s consider an average male who is 5 feet 10 inches tall and weighs 185 lbs. His BMI turns out to be 26.2 kg/m². As an increase in one unit of BMI translates into a weight gain of 7.1 pounds for this individual; so a 0.188 unit decrease of weight loss will be around 1.33 pounds. Coefficients reported in the Appendix, where the sample is also stratified by regions, show that the statistically significant results are being driven by different U.S regions as well; location also plays its’ part in influencing BMI or obesity.

Marginal effects and discrete changes are very useful when interpreting the result of a binary logit or probit model. To test the marginal effects, now turn to the analysis of
whether having health insurance is associated with the probabilities of being classified overweight or obese. Probit and Biprobit model of estimation was used and the results are reported in table 3. This model fits the data very well (p< 0.0000). The presence of health insurance is inversely related to the probabilities of being overweight and obese.

Table 3: Marginal Effects of Insurance on Probabilities of being Over-weight or Obese

<table>
<thead>
<tr>
<th>Variables</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Probit</td>
<td>Biprobit</td>
</tr>
<tr>
<td>Insurance</td>
<td>-0.0168*</td>
<td>-0.07105**</td>
</tr>
<tr>
<td>High School</td>
<td>-0.02168*</td>
<td>-0.05479***</td>
</tr>
<tr>
<td>Some College</td>
<td>-0.018636</td>
<td>-0.0246***</td>
</tr>
<tr>
<td>College</td>
<td>-0.0553***</td>
<td>-0.0579***</td>
</tr>
<tr>
<td>Age</td>
<td>0.01534***</td>
<td>0.01691***</td>
</tr>
<tr>
<td>Age Squared</td>
<td>-0.002056*</td>
<td>-0.001539</td>
</tr>
<tr>
<td>Black</td>
<td>0.1753***</td>
<td>0.3932***</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.03635***</td>
<td>0.2774</td>
</tr>
<tr>
<td>Other Race</td>
<td>-0.02486</td>
<td>-0.006435</td>
</tr>
<tr>
<td>Male</td>
<td>0.1233***</td>
<td>0.0758***</td>
</tr>
<tr>
<td>Children</td>
<td>0.08994***</td>
<td>0.03287***</td>
</tr>
<tr>
<td>Income1</td>
<td>-0.01273</td>
<td>-0.0457*</td>
</tr>
<tr>
<td>Income2</td>
<td>0.022**</td>
<td>-0.0317***</td>
</tr>
<tr>
<td>Married</td>
<td>0.09543***</td>
<td>0.19293***</td>
</tr>
<tr>
<td>Drinks</td>
<td>0.004819</td>
<td>0.008378**</td>
</tr>
<tr>
<td>Smokes</td>
<td>-0.08676***</td>
<td>-0.27915***</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>-0.03054***</td>
<td>-0.07471***</td>
</tr>
<tr>
<td>Fruits &amp; Vegetables</td>
<td>-0.01734</td>
<td>-0.05639*</td>
</tr>
</tbody>
</table>

|                | N=15,169   | N=15,169       | N=15,169        | N=15,169       |
| Observations    | Pseudo R²  | Estimated ρ   | χ² test of ρ=0  |
|                | 0.179      | -0.0364       | 3.627 [0.089]   |

Note: Absolute values of standard errors are in parentheses, p-values in brackets, and intercept not shown. Marginal effects are reported. Models also include state indicators, year indicators. Instruments are the percent of the workforce in firms of sizes 100-499 and 500+. * implies significant at 10%; ** implies significant at 5%; *** implies significant at 1%.
Using the bivariate probit results, it can be concluded that possession of health insurance is associated with a decrease in 7.105 percentage points in the probability of being overweight and a reduction the probabilities of 8.518 percentage points of being obese. This means that this present study rules out *ex-ante* moral hazard effect, where individuals who have health insurance have less incentive to engage in preventative behaviors. On the contrary, the young adults of my sample are taking the benefits of health insurance by engaging in preventive healthy behaviors. So, promotions of insurance (like the Affordable Care Act, 2010) among young U.S. adults have economic merits in dealing with obesity.

Table 4: IV Regression: Effects of Insurance on BMI across U.S. Regions

<table>
<thead>
<tr>
<th>Variable\Regions</th>
<th>Northeast</th>
<th>Midwest</th>
<th>South</th>
<th>West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Insurance</td>
<td>-0.1753***</td>
<td>0.0942</td>
<td>0.07556**</td>
<td>-0.2227***</td>
</tr>
<tr>
<td></td>
<td>(0.0647)</td>
<td>(0.0578)</td>
<td>(0.0379)</td>
<td>(0.0676)</td>
</tr>
<tr>
<td>Observations</td>
<td>N=2372</td>
<td>N=3841</td>
<td>N=4542</td>
<td>N=3920</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.482</td>
<td>0.389</td>
<td>0.422</td>
<td>0.544</td>
</tr>
</tbody>
</table>

*Note:* Absolute values of standard errors are in parentheses, Instruments are the percent of the workforce in firms of sizes 100-499 and 500+. Only main interested variable coefficient is reported. * implies significant at 10%; ** implies significant at 5%; *** implies significant at 1%.


*Midwestern States:* Wisconsin, Michigan, Illinois, Indiana, Ohio, Missouri, North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa

*Southern States:* Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Mississippi, Alabama, Oklahoma, Texas, Arkansas, Louisiana

*Western States:* Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona, New Mexico, Alaska, Washington, Oregon, California, Hawaii
However, the effect of having insurance does not have the same effect on BMI across all U.S states. It varies by state and regions. Table 4 reports IV regression results across various U.S regions. Northeast and West (significant at 1% level) regions show a negative relation between coverage of health insurance and BMI, Midwest region (not significant) and Southern (significant at 5% level) region reports just opposite result. Income disparities and availability of healthy food (traditionally southern diets are unhealthy) might be major contributing factors to this opposite findings.

6. Concluding Remarks

The benefits of health insurance to good health and welfare of individuals are highly valued, and are sometimes viewed as one of the basic human rights. However, economic theory suggests that insured individuals may respond to their insurance status differently and change their behaviors after having insurance (ex-ante moral hazard). This implies that receipt of insurance might result in an increase (decrease?) in unhealthy behaviors like, increasing drinking habits, stopping regular physical activity etc. On the other hand, insurance also allows an insurer to be in contact with medical professionals who not only advices the insurer to change his preventive and unhealthy behaviors, but also changes his use of medical care. These two effects may be offsetting and the net effect of insurance on health behaviors may be positive or negative.

This paper examines one particular manifestation of the moral hazard problem, the ex-ante moral hazard pertaining to body weight. First, a theoretical model of health insurance and health behaviors was built to explain ex-ante moral hazard in health insurance sector. Second, using BRFSS data for young adults (18-24 years) from 2001-2011, this paper identifies ex-ante moral hazard effect only; and employing IV regression
approach and Lewbel IV techniques tried to estimate the relationship between health insurance and obesity after controlling for physician visits as well as other possible endogeneity issues. It is estimated that a switch from no health insurance to having a health insurance is associated with a decrease in BMI of 0.188 kg/m$^2$ which means a weight loss of 1.33 pounds. The possession of health insurance is also associated with a decrease in 7.105 percentage points in the probability of being overweight and a reduction the probabilities of 8.518 percentage points of being obese. This means that this present study rules out *ex-ante* moral hazard effect, where individuals who have health insurance have less incentive to engage in preventative behaviors. On the contrary, American young adults are taking benefits of health insurance by engaging in preventive healthy behaviors.

We limited the sample for empirical estimation purpose to those individuals who are employed, in good health, and have no reported doctor visits in the past year or more. This is done to minimize the propensity for reverse causality from body weight to health insurance status and to mitigate the potential for *ex-post* moral hazard to confound empirical findings; however a RAND experiment like study by Newhouse (1993) would be an ideal one to study the actual effect of health insurance.
REFERENCES


Patient Protection and Affordable Care Act, 2010. Health Insurance Reform, USA.


