Does Health Insurance Encourage Obesity?
A Moral Hazard Study

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Abstract:

Obesity and the negative health conditions related to it have been a growing public health concern over the last few decades. While there are many factors contributing to the rise of obesity, one that is often overlooked is the ex-ante moral hazard effect of health insurance. Ex-ante moral hazard occurs when an individual takes on more risk knowing they will not bear the full cost of the consequences. Simply having health insurance allows an individual to bear a smaller portion of the costs of obesity as an insurance company now bears a portion of the costs. While other studies have estimated the moral hazard impact of health insurance on obesity and other life-style related illnesses, this is the first paper to look at the impact of public verses private insurance. I use cross sectional data from the National Longitudinal Youth Survey 1997 from 2011 and employ an instrumental variable technique to address the endogeneity between insurance coverage and body mass index (BMI). The results show that private insurance is predicted to increase BMI by 3.5 kg/m^2, while public insurance is predicted to increase BMI by 8 kg/m^2. This result demonstrates that, not only is there a significant moral hazard problem, but it is also highly sensitive insurance type. This study can be used to help inform insurance policy design to minimize inefficiencies associated with moral hazard.

Introduction:

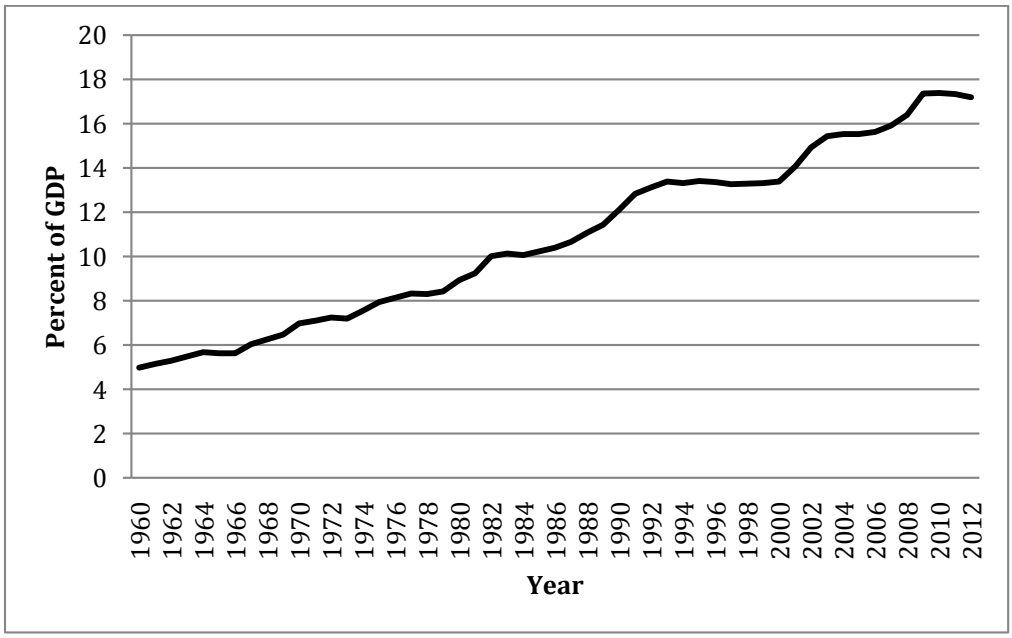
Like any insurance market, the health insurance market faces the problem of moral hazard. Just as having car insurance may encourage drivers to take on additional risks, having health insurance may encourage individuals to adopt less healthy lifestyles. One of the results of the health insurance process is likely to be a measurable decline in the healthfulness of lifestyle choices as people substitute away from healthy lifestyles to medical care consumption. Understanding the impact of moral hazard may be a critical step in addressing the obesity problem in the US. As of 2012, 35 percent of American adults and 17 percent of youth were obese, and lifestyle related illnesses account for fifty percent of all deaths in the US (Centers for Disease Control 2012; Cutler and Lleras-Muney 2010).

As seen in Graph 1, health care expenditure growth has far outpaced GDP growth in the United States since 1960 (US Census Bureau 2012). The growth in health expenditures can be divided into changes in the price for a given service (inflation) and the increase in the amount of health care consumed. Changes to less healthy lifestyles and rising obesity rates are likely contributing to the increased consumption of healthcare services. Obesity can lead to conditions such as type two diabetes, cardiovascular disease, high blood pressure, high cholesterol, stroke, certain cancers, sleep apnea, depression and many others (Mayo Clinic 2014). It is estimated that in 2008, obesity and related complications cost the United States $147 billion (Centers for Disease Control 2012).

This study seeks to determine the extent to which having public or private insurance increases individuals' body mass index (BMI) through lifestyle choices. There are a myriad of studies that try to address the cause of the increase in obesity rates over the past few

decades. While there is no argument that genetics play an important role in obesity, the recent increase in obesity is mostly attributed to lifestyle choices and environmental factors including access to cheap processed foods with high sugar content, and a shift toward a sedentary lifestyle (Must and Evans 2011). These lifestyle choices may be driven in part by the moral hazard effect. While there are many contributing factors for obesity, it is critical to understand the extent to which moral hazard impacts obesity because these inefficiencies can be minimized through insurance mechanism design.

Graph 1: Sum of National Health Expenditure as a Percentage of GDP



Source: US Census Bureau 2012

Many other types of insurance have ways to mitigate ex-ante moral hazard. For example, car insurance companies can use records of speeding tickets and car accidents to adjust insurance prices, mitigating the ex-ante moral hazard effect. This type of mechanism is more difficult to design for health insurance, as there are no public data on individual food choices in the way there are data on traffic tickets. Additionally there are frequently limitations on what information insurance companies can use to make pricing decisions.

A further distinguishing factor of health insurance is that people rarely feel the impact of the premiums as they are regularly incorporated into wages or covered through public insurance. While it is clear that individuals are paying for the premiums through lower wages for employer-sponsored plans (Baiker and Chandra 2005), Gustman and Steinmeier (2001) find that individuals are not aware of the value of their employer provided benefits, including health insurance, and therefore should not feel the cost. Rather, the structure of the policy's co-payment scheme, or generosity, is frequently the main mechanism that can impact moral hazard.

While ex-ante moral hazard is often mentioned in papers on health insurance, it is frequently written off as not a significant problem because poor health has a rather high cost to the individual in addition to the cost of medical care (Dave and Kaestner 2009). However, if this were true, one would expect the prevalence of lifestyle related illness to be very low. Several papers find a significant negative ex-ante moral hazard problem associated with health insurance including Klick and Stratmann (2006), who examine mental health coverage laws' impacts on addiction rates; Dave and Kaestner (2009), who look at the behavior of individuals around the Medicare cut off age of 65; and Kelly and Markowitz (2009), who look at moral hazard in employer sponsored insurance.

The purpose of this paper is to examine the impact of public and private insurance on moral hazard BMI. I use cross sectional data from the fourteenth round (conducted in 2011) of the National Longitudinal Youth Survey 1997. During round fourteen everyone in the study was between 26 and 32 years old. I employ an instrumental variable technique to address the endogeneity between BMI and insurance status. While the previous literature has shown that moral hazard exists within the health insurance market this is the first paper

to examine the impact of different types of insurance. This is a significant contribution to the literature as it allows for a more clear understanding of the impact of moral hazard on lifestyle related outcomes which will allow for more informed policy design.

I find that public and private insurance can increase BMI though moral hazard by about 7.5 and 3.5 kg/m^2, respectively. This result shows that, not only is there a moral hazard problem, but it is highly responsive to insurance type. Although this paper looks specifically at obesity, the results may carry over to other lifestyle-related illnesses.

Background

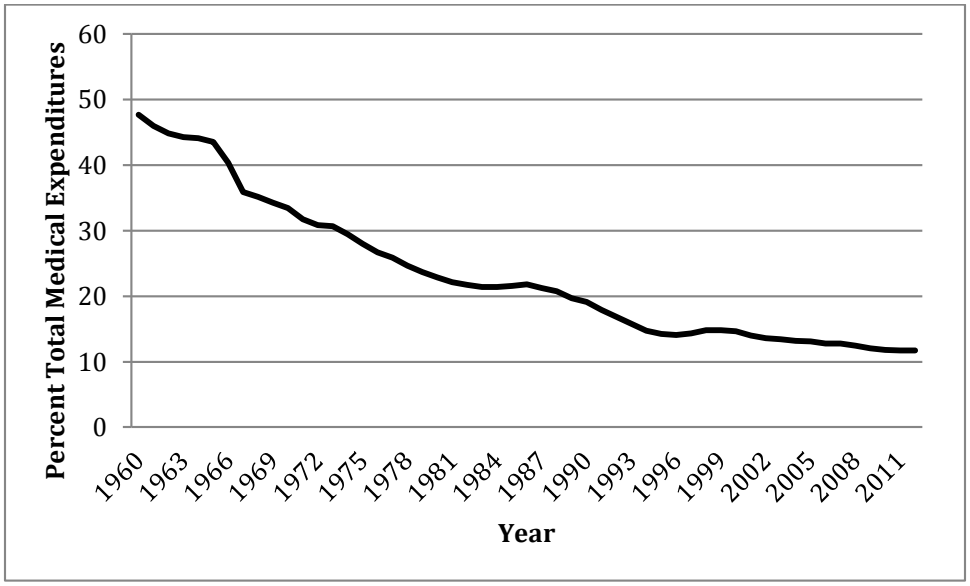
Generosity

In this study, the term "generosity" is used to describe the portion of health care costs covered by insurance. As seen in Graph 2, the percent of Total Medical Expenditures that individuals paid out-of-pocket has fallen from close to 50 percent in 1960 to roughly 12 percent in 2011. Both an increase in typical plan generosity and an increase in the percentage of people covered by insurance contribute to the reduction in percentage of expenditures that are out-of-pocket. The substantial increase in plan generosity over time has increased the moral hazard problem for insurance providers, as people have less financial incentive to make healthy choices. While Graph 2 is based on data from both public and private plans, public plans are typically more generous. The impact of the addition of Medicare and Medicaid can be seen in Graph 2 as the percent of out-of-pocket costs fell from 40.3 to 35.9 between 1966 and 1967 when the programs began.

In 2012, 150 million Americans, or 56 percent of the nonelderly population, had employer-sponsored health insurance (Kaiser Family Foundation 2012). While generosity

within employer-sponsored health insurance can vary by plan, there have been some long term trends in generosity. In 1960 the average out-of-pocket cost was 48 percent. Over time this fell to about 15 percent in 2000 and has stayed relatively constant since then (Blumenthal 2006). So, the average employer-sponsored insurance plan has a generosity of about 85 percent.

Graph 2: Percent of Total Medical Expenditures that are paid Out-of-Pocket



Note: This graph is both public and private insurance
Source: Centers for Medicare & Medicaid 2014

Public insurance, on the other hand, tends to be more generous. There are two main types of public insurance that may present in the data: Medicare and Medicaid. Medicare is only available to individuals over 65 years old or individuals under 65 with permanent disabilities that prevent them from entering the work force. Since the dataset used in this study is limited to the nonelderly, the only individuals that could be eligible for Medicare would be the disabled. There were only two individuals in the data that reported having a chronic condition that significantly limited their abilities as of 2009; they were excluded from the study. In 2012, 11 percent of the non-elderly had Medicaid coverage, or 48 million

people (Kaiser Family Foundation 2012). While the generosity differs across states and poverty level, the out-of-pocket costs are capped at around 5 percent in nearly every case (Medicaid 2013). So, the average generosity is around 95 percent.

In 2012, 18 percent of the non-elderly were uninsured, or about 47 million people (Kaiser Family Foundation 2012). While individuals who are uninsured should theoretically be taking on the full cost of their medical expenses, it is still likely for these individuals to not make payments of medical expenses if they cannot afford them, giving them some implicit insurance via failure to pay medical bills.

This study examines the moral hazard effect of health insurance and, more specifically, the difference in the moral hazard that exists between employer-sponsored private insurance and public insurance which may be driven by differences in generosity. A third category, privately purchased insurance is excluded from the current study because no valid instrument could be found to deal with the endogeneity. Individuals without insurance are included as the comparative base to examine the impacts of having insurance.

Impact of Expert Care

It has been noted in the literature that seeking expert care can have a confounding impact on the ex-ante moral hazard estimation. Physician visits are likely to be related to health insurance status and have a positive impact on health. With very few exceptions, insurance does not cover weight loss programs or procedures, so the primary way in which a physician can impact BMI would be indirectly, through counseling on lifestyle choices. While Kant and Miner (2007) have shown that those who have been counseled by physicians are more likely to attempt to lose weight, to my knowledge no study has

demonstrated that those who attempted to lose weight because of physician counseling were successful in their weight loss attempts. Ockene et al. (1999) shows physician counseling is only effective in actually electing weight loss if physicians have training and ongoing support in dietary counseling. Their study consists of 927 individuals that had high cholesterol who were treated by physicians who either have no specific nutrition counseling training, received training but no ongoing support, or received training and ongoing support. All physicians provided dietary counseling, however, only those who received training and support were successful at impacting patient's health status after a year. For the group treated by doctors with no training there was no impact on BMI, saturated fat intake, and minimal change in LDL level. On the other hand, substantial improvements were seen in health measures of patients of physicians who received training and ongoing support. Only minor improvements were found for doctors with training, but no ongoing support. This study demonstrates that, while the average physician counseling may change people's attitudes towards weight loss, it will have no impact on lifestyle unless the physician was specifically trained in this type of counseling. Since there is no indication that there has been large scale physician training, let along ongoing support of this training, I assume that there should be no change in BMI as a result of physician counseling. Therefore I conclude that this confounding effect of doctors' visits that other moral hazard papers discuss is negligible and therefore will not be taken into account in the models presented below.

Rate of Time Preference

An implicit assumption of this study is a consistent rate of time preferences. While most standard economic models require that agents act rationally, there has been much research by behavioral economists in the area of obesity that shows that this rationality assumption does not always hold. Measures of debt and savings have been used to show people facing inconsistent time preferences in their finances are more likely to be obese, suggesting they face similar time inconsistences when it comes to preventative care (Komlos, Smith, and Bogin 2004). However, the idea of domain independence suggests that the optimal measure would not be debt and savings, but some measure within the area of health. (Odum, Baumann, and Rimington 2006; Lawless, Drichoutis, and Nayga 2013).

It is expected that those who face consistent time preferences will be more likely to experience moral hazard in health insurance. This would be an example of rational obesity in which the present benefits of poor life-style choices outweigh the discounted long term costs. Since individuals with consistent time preferences are able to properly account for the future cost of present diet and exercise habits, they are more likely to experience moral hazard. Those who face irrational preferences, however, may not be able to properly weigh long-run costs and benefits and therefore may make poor lifestyle choices regardless of insurance status.

Currently I have no way of taking time preferences into account in the model, although I hope to address this problem in the future. However, it is likely that a variety of time preferences exist in the sample which could impact the extent to which individuals experience moral hazard.

Selection Bias

The decision process for obtaining different types of insurance is rather complex and may lead to a selection bias problem. There are fundamental differences between those who have employer-sponsored and public insurance that I control for in the estimation using education, race, gender, income, and other variables. Nonetheless there still may be some selection bias based upon unobservable factors. There has been some suggestion that there may be discrimination against obese individuals in the job market, despite the illegality of this form of discrimination. Bhattacharya (2009), finds that obese workers receive lower wages than their counterparts, but only when the firm provides employer-sponsored insurance, suggesting the cost of obesity is passed on to the individual through lower wages. Baicker and Chandra (2005) suggest that, as health costs increase, firms move higher-cost employees into part-time positions that are not covered by employer-insurance. These forms of discrimination could cause higher rates of obesity in public insurance or in the uninsured segment of the population as these individuals are pushed out of employer-sponsored insurance.

When it comes to public insurance, there could again be a selection bias. In order to get public insurance, Medicaid in this study, an individual must know he or she is eligible and choose to sign up. This bias could go either direction. Those who are sicker may be more likely to sign up because they are more in need of care. On the other hand, unhealthiness may be a direct result of a lack of health knowledge, which would likely be correlated to knowledge of eligibility, making them less likely to sign up. Additionally, those with time inconsistent preferences may be less likely to sign up as there is an

immediate time cost, with no immediate benefit. So it is unclear whether there is a significant bias, and in which direction the bias would be.

Literature review

While ex-ante moral hazard is often mentioned in papers on health insurance, it is generally written off as not a significant problem. Poor health has a rather high cost to the individual in addition to the cost of medical care (Dave and Kaestner 2009). No matter how generous the insurance, individuals will always take on the cost of not feeling well, taking off from work, and other costs associated with poor health. So it has been suggested that there is little to no moral hazard as people have the incentive to be healthy anyway. However, this argument breaks down when looking at the lifestyle-related illnesses currently in the US. If being sick is too costly, even without medical expenses taken into account, then one would expect to see very low rates of obesity and other lifestyle-related illness. Since obesity has proliferated, it is clear the individual cost is not enough to incentivize many people to stay healthy, then there is reason to believe moral hazard is present.

While most papers write off ex-ante moral hazard as insignificant, there are a few papers that address this issue in the context of lifestyle-related illness. The RAND Health Insurance Experiment of the 1970s has long been considered to be unmatched in health insurance studies (Gruber 2006). This experiment randomly assigned two thousand families to insurance plans with varying levels of co-payment and followed them over a five year period. The experiment shows that co-insurance rates have a significant impact on the quantity of care received. Klick and Stratmann (2006) find states that mandate

improvements to mental health coverage (including addiction counseling) have an ex-ante moral hazard impact of increased per-capita alcohol consumption of 18 percent or the equivalent of about 48 beers per capita per year. Klick and Stratmann use an instrumental variables technique to address the endogeneity between time of increased coverage's mandates and per-capita consumption. Dave and Kaestner (2009) examine the differences in men's preventative behavior and health insurances around the age of 65, when Medicare begins. They use the beginning of Medicare because of its plausible exogeneity. They control for the confounding effect of expert care by including doctor visits in the past year as a control variable. Dave and Kaester find that receiving insurance has positive impacts on drinking and smoking, and negative impacts on exercise, which is generally consistent with an increase in unhealthy behavior.

Kelly and Markowitz (2009) attempt to derive the impact of moral hazard on obesity and they find that there is a significant increase in BMI associated with ex-ante moral hazard for employer-sponsored health insurance. They claim that doctor visits have a serious confounding effect and attempt to remove the impact of doctor visits by excluding anyone from their study that had visited a physician in the last year; however, this method has a significant flaw. Anyone who has already experienced moral hazard in a previous period, which is likely for anyone who has been on insurance previously, and became sick as a result, is highly likely to visit the doctor since the basis of moral hazard is that you can take on the risk of illness expecting to seek care. In this way, they would be removing both the confounding effect and much of the ex-ante moral hazard that they are trying to estimate. This restriction should bias downward estimates of ex-ante moral hazard prevalence.

Theoretical Model

To determine the extent to which moral hazard contributes to obesity in the health insurance market, a model of health must be constructed. An individual's health is very complex, as it is influenced by genetics, education, socioeconomic status, other demographics, insurance status, individual preferences and rate of time preferences. This model draws from Grossman's (1972) model of health capital. The health of individual i at time T can be modeled:

$$H_T = S + \sum_{t=1}^{T} \big(L(I_t, \tau_t, P_t)\big) e^{rt} \qquad (1)$$

H is some health measure of an individual at time T, which is affected by all decisions made prior to period T, thus the summation across all prior periods. When this model is tested later in the paper, BMI will be used as the health measure. S is a vector of time-invariant demographic and family background controls. L is a function that determines lifestyle choices' impact on health. It is a function of insurance status (I_t), individual rate of time preference (τ_t), and all other personal preferences including risk preferences, (P_t). The individual rate of time preference (τ_t) is allowed to change over time since peoples' rate of time preferences generally shrinks as they mature. Past decisions have a significant impact on current health, so the discounted sum of past lifestyle choices is included, where r is the discount rate such that the more recent observations are stronger determinants of present health.

The L function should pick up any impact that personal lifestyle choices have on health, so in the case where BMI is the dependent variable, the important lifestyle choices

should include diet and exercise. However, diet and exercise are not directly in the model as they are a result of the lifestyle choices. The impact of insurance status on lifestyle choices is the direct measure of ex-ante moral hazard. As discussed above, rate of time preference is also an important consideration in lifestyle choice.

Personal preferences, P, make up the remainder of the lifestyle choices. These preferences include personal taste over food, exercise and risk. Risk could have two key impacts on the model. The first thing to consider is the risk of being uninsured. Risk-loving people may have no problem being uninsured, while risk-averse individuals may be willing to pay well above actuarially fair rates to cover risk. For the most part in the US, insurance is tied to job status for employer-sponsored insurance, and tied to poverty level and having children for public insurance. Thus, risk preferences generally do not enter into insurance status except indirectly through job choice. For example risk adverse individuals may choose to say at an unsatisfactory job to keep insurance (frequently referred to as job lock). The second consideration would be risk preferences over health status. Some people may be rationally willing to take risks, such as eating unhealthily even though it increases risk of health problems, while others equally rationally may eat a strictly healthy diet because they are not willing to take on the risk to their health. The data are restricted to 26-32 year olds, so it is expected that they will be less risk-averse than an older adult population would be (Palsson 1996).

It is clear that decisions in previous periods impact present health conditions, so health decisions are made based on expected future health insurance status. This model assumes that people were able to predict their future health insurance in the period decisions were made.

Taking the partial derivative with respect to I yields:

$$\frac{\partial L(I_t, P_t, \tau_t)}{\partial I_t} < 0 \tag{2}$$

So as generosity increases, lifestyle choices will be less healthy. In other words, when higher generosity insurance is present, people will substitute away from a healthy lifestyle because they no longer realize the full cost of expert care as it becomes relatively cheaper.

Unfortunately, data constraints limit this study to the use of one time period. The model that is estimated later in the paper is derived from a non-dynamic version of the theoretical model that can be written as:

$$H_t = S + L(I_t, P_t, \tau) \tag{3}$$

Data

The data were taken from the National Longitudinal Survey of Youth 1997. Many of the variables of interest were only given in one or two years, so this paper uses cross-sectional data from round 14, which was conducted in 2011. It should be noted therefore that these data are prior to the implementation of the Affordable Care Act which will change the structure of the insurance market in the future. During this round, all responders were between 26 and 32 years old. Parent's BMI was calculated using data from the first round of the survey. Summary statistics can be found in Table 1.

Anyone who was pregnant since the last survey round was dropped because their BMI could be significantly impacted by a recent (or current) pregnancy. The average BMI was 28.13, which falls in the overweight category. While BMI is not the ideal measure of obesity for several reasons, including that it does not distinguish between fat and lean mass,

it is still generally used because of ease of measurement. BMI can be self-reported, while other measures of obesity generally need to be taken by a professional.

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
BMI	28.13	6.75	15.20	46.83
Uninsured BMI	28.01	6.68		
Employer Insurance BMI	27.67	6.38		
Public Insurance BMI	29.58	8.07		
Income (in $10,000)	5.18	4.22	0	36.1
Health Risk Tolerance	2.97	2.19	0	10
Age	28.77	1.46	26	32
Parent BMI	27.06	6.17	14.82	65.8
Health Coverage	0.66			
Employee	0.49			
Public	0.12			
Edu	0.35			
Non-white	0.39			
Female	0.48			
Nonwhite female	0.24			
Children	0.46			
Married	0.37			

Data source NLYS 1997. Note: Any BMI that was an outlier (Mean ± 3standard deviations) was dropped from the study because of assumed data error.

Income is a measure of annual income in ten-thousands including salary and income from self-employment. Parent BMI is a measure of one of the parents' BMI at the first round of the Survey (1997). It is used to control for the genetic factors that contribute to obesity. It also likely to account for some learned behavior and preferences since preferences and lifestyle habits are often learned from parents. Health risk is a measure of how much risk people said they were willing to take with their health on a one to ten scale. This variable should control for risk preference over health. This measure may have limited meaning as it is the individual's perception of their own risk, and individuals may interpret the meaning of 'health risk' in very different ways.

Within this sample 66 percent of individuals had health insurance, with 49 percent on employer sponsored insurance, 12 percent on public insurance, and 5 percent with private insurance. Education is a dummy variable for those who earned a degree higher than a bachelor's degree. This dataset only had years of education available up through high school, and reported degrees earned thereafter. The variable children is a dummy variable for individuals that have at least one child.

Results

I first present the results of a simple OLS model; see Table 2 Model 1. However, there were obvious endogeneity problems to deal with. I use the instrumental variable (IV) approach to address the endogeneity of insurance plans with BMI. For employer-sponsored health insurance I use individual or individual's spouse having a job that provides an income of over $20,000 a year. Public insurance was instrumented with variables that determine Medicaid eligibility, including whether the household was below the poverty line or 138 percent of the poverty line, and if there are children in the household, as these are all factors in Medicaid eligibility. I run the Hausman test, and the F-test on instruments and the Basmann test of over-identification restrictions. All of these tests suggest that my approach and instruments are valid. (For first stage results please contact the author.) The IV approach was used in model 2.

The coefficients for health care are 3.44 kg/m^2 for employer-sponsored and from 7.95 kg/m^2 for public insurance. Both are significant, however employer-sponsored insurance is only significant at the 10% level. These results are estimations of the moral hazard impacts of either insurance in relation to being uninsured. The difference between

the mean BMIs of the two types of insurance was less than 2 kg/m^2, while the difference between estimated two moral hazard coefficients is much greater than 2 kg/m^2, suggesting that the underlying difference in group structure is not the only thing driving these results.

The moral hazard results are consistent with my prediction that public insurance has greater ex-ante moral hazard impact than employer-sponsored insurance. To put these results in perspective for a 5'6" female with a BMI of 22 (the middle of the "normal" range) an increase of 3.4 points of BMI would be an increase from 136.5 lbs. to 157.5 lbs. (21 lbs.) and would move her into the low end of the overweight category. An increase of 8 points would make her 186lbs (a 49.5lbs increase) and put her in the low end of the obese category. These results suggest that, not only is there a significant moral hazard problem, but it is highly responsive to changes in insurance type, which may be driven by differences in generosity and other differences between insurance types.

To verify my results, I perform a robustness check in which I include all of the possible lifestyle choices in the data set including things like exercise, fruit and vegetable consumptions, fast food consumption, and average hours of sleep. If my results are truly driven by moral hazard then the inclusion of these measures should render the results insignificant because these lifestyle choices should already take into account moral hazard. In the results of the robustness check coefficients for both types of insurance are highly insignificant. This confirms that the results above are driven by moral hazard's impact on lifestyle choices. (To see these results, please contact the author.)

The remaining coefficients all have the expected signs and follow with results from previous literature. Parental BMI, which was not available in any of the previous studies is

highly significant, which is expected based on the knowledge of the genetic component of obesity.

Table 2: Regression Results: Dependent Variable is BMI

Variable	Model 1	Model 2
Intercept	14.61***	16.88***
	(1.91)	(3.36)
Employer Health Care	0.16	3.44*
	(0.23)	(1.82)
Public Health Care	0.61	7.95**
	(0.39)	(3.55)
Health Risk	0.01	0.06
	(0.03)	(0.06)
Education	-1.11***	-1.27***
	(0.23)	(0.37)
Age	0.21***	0.08
	(0.07)	(0.11)
Non-white	0.44*	0.94**
	(0.23)	(0.46)
Female	-1.13***	-1.4***
	(0.21)	(0.34)
Black-Female	2.28***	2.80***
	(0.42)	(0.91)
Children	0.38*	0.32
	(0.22)	(0.36)
Household Income	-0.08***	-0.16***
	(0.03)	(0.06)
Married	0.78***	0.93**
	(0.23)	(0.37)
Parent BMI	0.26***	0.26***
	(0.02)	(0.03)
North Central	0.15	-0.31
	(0.30)	(0.49)
South	0.13	-0.28
	(0.28)	(0.49)
West	0.05	-0.39
	(0.30)	(0.53)
Adjusted R^2	0.14	0.12
N	3,278	1,435
Model Attributes:		
OLS	X	
IV		X

*Significant at 10%; **significant at 5%; ***significant at 1%.
Standard errors included in parenthesis. Data source NLYS 1997.

Conclusion

This analysis illuminates the presence of ex-ante moral hazard in the health insurance market. The results build off previous studies by demonstrating that the moral hazard effect significantly differs across insurance type, which may be driven by differences in plan generosity. Given that Dave and Kaestner (2009) find moral hazard effects among elderly health insurance holders and the current study finds moral hazard effects among young adults, other researchers should avoid dismissing the moral hazard effects from their research. While these results suggest that there may be a moral hazard effect across all age groups, other age groups need to be examined. Finally, these results suggest that some effort be put into designing ways to minimize/reduce the moral hazard problem.

While the results point out a negative aspect of health insurance, this paper is in no way suggesting health insurance itself is undesirable. These results should be used to help promote optimal insurance policy design. If these results are driven by the generosity of the insurance policy then there are clear tradeoffs between different generosities. With a plan that is too generous, there is a clear ex-ante moral hazard problem; however, with a plan that is not generous enough, too much of the risk of catastrophic illness is still placed on the individual. However, the prevalence of moral hazard suggests there are inefficiencies in the market. To correct these inefficiencies, other insurance types have begun using monitoring and rewards systems, such as car insurance companies offering good driver discounts. More recently some health insurance providers have begun offering incentive programs such as rebates to individuals who partake in insurance sponsored

healthful activities. However, further research is needed to determine if these activities represent a move toward efficiency in the health insurance market.

While this study provides critical insight into health insurance markets there are several limitations to the study. Due to data constraints the study is cross sectional which does not allow us to understand the dynamic aspects of how behaviors may adjust to changing insurance status. Furthermore, additional information about plan type and generosity would allow for a more meaningful conclusion on the impact of generosity on moral hazard. Finding a way to allow an individual rate of time preference would further strengthen the results of this study. Finally, the data set is all younger adults between 26 and 32. With many of the consequences of unhealthy activities still in the future, they may be more likely to take on more unhealthy behaviors. Thus, they may not represent the decisions made by adults between 35 and 65 years of age.

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