Impact of Medicare Coverage on Mental Healthcare Utilization

Prepared for

R. Vincent Pohl

Senior Thesis in Economics

Spring 2018

Prepared by

Aakash N Patel

aakashpatel@uga.edu

April 13, 2018
Abstract

Mental health is an area of growing concern domestically and internationally, and mental illness is the leading cause of disability in the United States. One growing area of interest is determining whether mental healthcare is utilized sufficiently when needed. In this paper I seek to determine if there is a statistically significant increase in total out of pocket expenditure on healthcare and utilization of mental health services when a patient is eligible for Medicare. I investigate this using a regression discontinuity design that relies on the Medicare eligibility threshold. I find that upon becoming eligible for Medicare average out-of-pocket spending drops by $184.64 overall and the rate of spending is lowered to $21.30 as individuals age one year. On the other hand, I find that both Medicare eligible and non-eligible individuals decrease the number of psychiatrist visits by .004004 for each additional year of age, with no significant difference in utilization among the two age groups.
Impact of Medicare Coverage on Mental Healthcare Utilization

Introduction

One of the health shocks that is often overlooked but gaining recognition universally is that of mental illnesses. Mental health includes our emotional, psychological, and social wellness, which affects how we make decisions, interact with others, and work through stress. This is true for every stage of life for every person. When mental disorders are untreated they can hinder one’s ability to maximize their professional, social, and interpersonal contributions to society (Kutcher 2008). A significant number of adults that are mentally ill do not receive any treatment for their condition, even with the increase in treatment rates over the past 2 decades (Walker 2015). Researchers found that 62% of the mentally ill and 41% of the seriously mentally ill did not receive any treatment for their conditions, and furthermore it was estimated that there was an unmet need of 21% for mental illness and 42% for serious mental illness (Walker 2015). Those who reported an unmet need attributed this to barriers such as high cost, lack of insurance or underinsurance, lack of knowledge as to where to seek treatment for mental health disorders, furthermore attitudinal barriers such as perceived stigma and perceived ineffectiveness of treatments played a role. This is further supported by studies that have found higher uninsured rates among the mentally ill (Rowan 2014).

Mental illness has become one of the top causes of disability in the United States, and the disease burden of mental illness is among the highest of any diseases. For example, suicide is the 10th leading cause of death (43,000 incidents/yr) and neuropsychiatric disorders are the leading cause of disability in the United States (18.7% of all years of potential life lost to disability and premature mortality) (Roehrig 2016). Recent studies have estimated that mental disorders are the costliest health condition at a macro level, costing roughly $201 billion dollars in 2013 (Insel 2008).

A primary objective of health insurance is to hedge an individual’s risk of significant financial loss due to unanticipated health expenditure due to health shocks (Helena et. al 2015). Being covered by health insurance is especially pertinent to senior citizens due to the fact that roughly half of an individual’s lifetime medical spending occurs after age 65 (Helena et al 2015, Alemayehu & Warner 2004), and this is further supported by fact that 5% of households over age 65 have lifetime healthcare expenditures reaching $310,000, and the elderly on average spend $200,000 on healthcare in total (Webb & Zhivan 2010). Near elderly adults who are uninsured utilize fewer basic clinical services, are at increased risk of health decline, and die earlier on average when compared to insured peers (McWilliams et al 2003, Ayanaian et al 2000, Baker et al 2001, McWilliams et al 2004).

Nearly 28 million Americans lack health insurance, and another 30 million are estimated to be underinsured. The vast majority of these people are under the age of 65. On the other hand, less
than 1% of the elderly population (65+) are uninsured due to the availability of the fee-for-service Medicare (Card et al. 2008).

When measuring the expenditure and utilization of healthcare in general, many previous studies have used the Medicare eligibility threshold at age 65 as a natural treatment effect line where heterogeneity in basic healthcare coverage moves sharply towards homogeneity (Card et al. 2008, McWilliams et al. 2003, Anderson et al. 2012). Because Medicare can be viewed as basic universal health coverage for the elderly, it can create a discontinuity in health insurance coverage proportion and can serve as a random assignment for individuals near the Medicare eligibility threshold. Researchers found that at the onset of Medicare eligibility at 65 there were significant increases in medical care utilization, which varied by the type across groups and service types (Card et al. 2008). Groups that lacked coverage before enrolling in Medicare had the greatest increase in overall access to care and physician visits (Card et al. 2008). The literature however seems to lack any information as to how expenditure on and utilization of mental healthcare services differs across this Medicare eligibility threshold, and with this study I seek to add to the literature with regard to mental healthcare near this threshold. I believe this will add valuable information to knowledge of patient behavior with regard to investment in mental health among the two previously mentioned age groups.

Retirement decisions are affected by numerous factors including the availability of health insurance coverage, and workers in poor health tend to retire earlier than those who are healthy (Dhaval et al. 2008). One study found that when controlling for other confounding variables, complete retirement leads to a 6-9% decrease in mental health, which could be attributed to a decline in physical activities and social interactions (Dhaval et al. 2008).

I seek to determine if there is a statistically significant increase in total out of pocket expenditure on healthcare and utilization of mental health services when a patient is eligible for Medicare. I expect the mental health service utilization to increase when comparing Medicare beneficiaries to non-Medicare beneficiaries. To be clearer, I believe that on average a person who is near elderly (50-65) and not a Medicare beneficiary will spend more on healthcare when they enroll in Medicare as an elderly person (65+). Furthermore, I expect the utilization of mental healthcare to increase when individuals become Medicare eligible due to the fact that more people on average will have access to health insurance.

I will use a regression discontinuity design to determine if there is a significant difference in mental healthcare expenditure between the two groups. Regression discontinuity can provide a credible and transparent way of estimating the effects of many programs in a wide variety of contexts which is helpful for economic analysis. In layman’s terms it can help determine if there is a “jump” in mental health expenditure for patients soon after enrolling in Medicare. This can give us an idea as to whether mental healthcare is underutilized or overutilized due to insurance status and will provide further implications for stakeholders.
Methods

Data

The data I will be using is from the Medical Expenditure Panel Survey (MEPS) published by the Agency for Healthcare Research and Quality (AHRQ). The MEPS is a large-scale set of surveys that are completed by employers and households in the United States. MEPS is considered to be the most complete data source available on health insurance coverage, healthcare use, and healthcare expenditure.

I am specifically using the Household Component of the MEPS, which consists of data collected from families and individuals across the United States, and this set is taken from a nationally representative subsample of households that completed the National Health Interview Survey in the previous year. I also used the Office-Based Medical Provider Visits, which provides very detailed information on an individual’s office-based medical provider utilizations and expenditures during the calendar year of interest. These files contain characteristic information such as the date of visit, time spent with the provider, treatment and services received, prescription information, ICD codes for medical conditions, overall expenditure, and the payment sources for the visit and services. The files for the Household Component and Office-Based Medical Provider Visits were then linked together so that the necessary regressions could be run.

The MEPS collected very detailed information for every person in each household through household interviews. The information includes: demographic characteristics, health status, health conditions, medical service usage, payment charges and sources, care access, satisfaction with healthcare, income, employment status, and insurance coverage.

The survey was designed as a panel, which includes a few rounds of interviewing over the period of two complete calendar years, which allows us to determine how an individual’s health status, employment status, income level, public and private insurance coverage eligibility, healthcare usage, and payment are all interrelated.

In the final dataset used for calculations there is a total of 39,744 observations, and the dataset was restricted to individuals 50-85 years of age since it is the target group of interest. These observations are from the previously mentioned MEPS files, and they include data from 2012 through 2015, which were the most recently available data files.

Analytical Framework

The objective of this paper is to assess the effect of the Medicare eligibility threshold on mental healthcare expenditure for the near elderly and elderly. The following equation is a general form of the regression discontinuity design that I use in my analysis:
Equation 1: $$D_a = \begin{cases} \ 1 & \text{if } a \geq 65 \\ \ 0 & \text{if } a < 65 \end{cases}$$
$$y_{ij} = \alpha + \beta \cdot D_a + \gamma \cdot a + \epsilon$$

where \( y_{ij} \) is the independent variable of interest dependent on the age threshold. In this paper the two independent variables of interest from the MEPS dataset is \( TOTSLF \) and \( VISITS \). \( TOTSLF \) represents the total out of pocket amount paid for healthcare services by an individual in the given year of data. \( VISITS \) represents the total number of visits to a psychiatrist’s office by an individual in the given year of data. I will be using the number of visits to the psychiatrist’s office as a proxy to represent mental healthcare utilization, which will not fully capture the idea of interest. With this in mind, omitted variable bias will likely be a factor in the results of this paper. In Equation 1 \( \alpha \) represents the intercept of the ordinary least squares regression line. \( \beta \) represents the coefficient of \( D_a \), which is the dummy variable that indicates whether the recipient is Medicare eligible based off of the age 65 eligibility threshold, which in my regression is called \textit{medicare}. In a regression discontinuity design \textit{medicare} is called the running variable because the coefficient estimates the treatment effect. In this case \textit{medicare} is equal to 0 if the individual is older than 65 and equal to 1 if the individual is older than 65 \( \gamma \) represents the coefficient of \( a \), the variable that represents the age of an individual. In the MEPS dataset \( a \) is represented by the \( AGE42X \) variable, which consists of the age of the individuals in the round 2 or 4 interview dates from the survey. Lastly, \( \epsilon \) is the random error component which accounts for how far above or below the true regression line is with regard to the real world observations. Of note is that in my actual regression I added an interaction term called \textit{interact}, which attempts to account for the different effects on the outcome variable, \( y_{ij} \), by the \textit{medicare} dummy variable and the \( AGE42X \) age variable. The coefficient for the interaction term is represented by \( \delta \). The regression discontinuity design output will provide estimates for the treatment effect of being eligible for Medicare. I used a linear model for of the regression discontinuity design due to the seemingly linear nature of the data seen in the scatter plot, so a test of non-linearity would not be fully necessary.

Results

Equation 2: $$TOTSLF_{ij} = \text{cons} + \beta \cdot medicare + \gamma \cdot AGE42X + \delta \cdot interact$$

Equation 2 provides the model actually used to perform the regression analysis for the outcome variable of interest \( TOTSLF \). Using Equation 2 the following regression output was obtained:
Table 1. Ordinary Least Squares Regression of *Equation 2*

|        | Coefficient | Standard Error | t-statistic | P > |t| |
|--------|-------------|----------------|-------------|------|---|
| AGE42X | 32.16975    | 3.597139       | 8.94        | 0.000|
| medicare | 521.8936   | 279.7156       | 1.87        | 0.062|
| interact | -10.87903  | 4.415548       | -2.46       | 0.014|
| constant | -1091.719  | 205.5932       | -5.31       | 0.000|

The regression estimates that for every 1-year increase in age between 50-65 years of age, that on average there is a $32.17 increase in the total out of pocket amount paid for healthcare services by an individual in the given year. With a p-value of 0.00, this result is statistically significant, which suggests a positive linear relationship between age and out of pocket payments for healthcare services. For individuals between 65-85 years of age the regression estimates that on average for a 1-year increase in age there is a $21.30 increase in the total out of pocket amount paid for healthcare services by an individual in the given year. The way that I calculate this $21.30 is through a simple summation of the coefficients for AGE42X and interact provided in Table 1. It is important to note that the p-value for the dummy variable term is .062, which at a 0.05 confidence level would not be considered statistically significant, but it is very close. Furthermore, the p-value of the interaction term is .014, which is statistically significant and suggests there is a relationship between the medicare variable and AGE42X variable. The interaction term, medicare, is the cause of the lower slope of $21.30 per year of age for households over the age of 65.

In addition to regression discontinuity outputs, Figure 1 is included to provide a visual display of the sharp discontinuity. Figure 1 presents the age profile of those in the survey and their total household healthcare expenditure in dollars.
One should notice the more positively sloped expenditure curve for individuals between ages 50-65, suggesting for every additional year of age these individuals spend more out of pocket on healthcare when compared to those between ages 65-85. Furthermore, there is a sharp discontinuity at the Medicare eligibility threshold with regard to total self-expenditure for households where the total household expenditure drops. Figure 1 also includes the scatterplot of the original data in which the mean of total household expenditure was calculated for each age.

**Equation 3**: \( \text{Visits}_{ij} = \text{cons} + \beta \cdot \text{medicare} + \gamma \cdot \text{AGE42X} + \delta \cdot \text{interact} \)

*Equation 3* provides the model actually used to perform the regression analysis for the outcome variable of interest VISITS. Using *Equation 2* the following regression output was obtained:
Table 2. Ordinary Least Squares Regression of Equation 3

| Visits     | Coefficient | Standard Error | t-statistic | P > |t| |
|------------|-------------|----------------|-------------|-----|-----|
| AGE42X     | -0.0049494  | 0.0023884      | -2.07       | 0.038 |
| medicare   | -0.1201154  | 0.1857231      | -9.65       | 0.518 |
| interact   | 0.0009469   | 0.0029318      | 0.32        | 0.747 |
| constant   | 0.4993359   | 0.136508       | 3.66        | 0.000 |

The regression estimates that for every 1-year increase in age between 50-65 years of age, on average there is a .00495 decrease in the total amount of psychiatric visits by an individual in the given year. With a p-value of 0.038, this result is statistically significant, which suggests a negative linear relationship between age and out of the total amount of psychiatric visits per year by an individual. For individuals between 65-85 years of age the regression estimates that on average for a 1-year increase in age there is a .004004 decrease in the total amount of psychiatric visits by an individual in the given year. Similar to the previous regression, the .004004 decrease was calculated by summation of the coefficients for AGE42X and interact. It is important to note that the p-value for the dummy variable, medicare, is .518, which at a 0.05 confidence level would not be considered statistically significant, which suggests no true discontinuity exists. Furthermore, the p-value of the interaction term is .747, which is not statistically significant and suggests a lack of a relationship between the medicare variable and AGE42X variable.

Figure 2 is included to provide a visual display of the sharp discontinuity. Figure 2 presents the age profile of those in the survey and their number of visits with a psychiatrist for the given year.
One should note that more negatively sloped curve for individuals between ages 50-65, suggesting for every additional year of age these individuals visit the psychiatrist’s office less frequently when compared to those between ages 65-85, but the p-value from table suggests these differences are not statistically significant. Additionally, Figure 2 contains a scatterplot of the original data in which the mean number of psychiatric office visits was collapsed and plotted by age.

Discussion

This study is unique in that I leverage the natural Medicare eligibility threshold at age 65 to investigate the relationship between health insurance coverage status and its effect on mental healthcare utilization, which has not specifically been examined in this manner. This investigation is timely in that there is a shortage of mental healthcare workers and an overall rising recognition of mental illness in the United States (Nguyen 2017). It is crucial to note that the findings of this study may not be generalizable to the entire age spectrum of the general population. The behavior of the near-elderly and elderly populations with regard to healthcare expenditure and mental healthcare utilization may be vastly different than that of other age groups.
Changes in Out-Of-Pocket Expenditure by Household Age

In this study I found that after reaching the age minimum for Medicare eligibility average out-of-pocket expenditure on general healthcare dropped overall and the rate of increase with age dropped as well from $32.17 to $21.30. The overall out-of-pocket spending drop is likely due to the fact that upon becoming eligible for Medicare the proportion of uninsured individuals drops significantly (Card et al 2008). The drop in overall out-of-pocket spending that I found can be explained by the idea that as a significantly larger proportion of individuals become eligible for Medicare, out-of-pocket costs should drop due to the increase in insurance payments. A study by the Kaiser Family Foundation similarly finds that out-of-pocket costs for the near elderly is on average 35% of per capita Social Security income, whereas for individuals age 65-74 there is a slight drop to 34% of per capita Social Security income (Cubanski et al 2018). Moreover, for each 10-year age category over age 65, the out-of-pocket spending slowly increased, which is consistent to the findings of my paper (Cubanski et al 2018). Prior to age 65, the less educated (Asians, blacks, and Hispanics) had a 25 percentage point difference in insurance coverage rates when compared to whites; however, after age 65, the disparity gap falls to just 10 percentage points (Card et al 2008). Additionally, there is a widening of the disparity in the generosity of the coverage found in that dual coverage increased by only 20 percentage points for less educated minorities, whereas for whites dual coverage increased by 60 percentage points (Card et al 2008).

Changes in Psychiatrist Office Visits by Household Age

The main purpose of this study is to analyze the greater proportions of insurance coverage after age 65 and its effect on utilization of mental healthcare services. Specifically, in this paper I use psychiatric office visits to proxy usage of mental healthcare due to the limitations of the MEPS datasets. My findings will help fill the gap in the literature due to the lack of regression discontinuity designs that examine mental healthcare usage. My findings suggest that there is not significant difference in the utilization of mental healthcare services due to an individual’s eligibility for Medicare. This is surprising due to the findings of other studies where eligibility for Medicare caused a significant jump in use of healthcare services (Card et al. 2008). Additionally, studies have found higher uninsured rates among the mentally ill (Rowan 2014), which would lead me to suspect that a greater use of mental healthcare services should have been observed. One explanation for this is that the uninsured mentally ill do not recognize poor mental health status or lack the knowledge that they should attempt to visit a psychiatrist. Other studies find that relatively low cost health goods such as physician visits increase sharply at the age-eligibility threshold for Medicare, and this increase is even greater for minority groups with low insurance coverage rate (Card et al. 2008). This further leads me to believe that a statistically significant increase in psychiatrist’s office visits should have been observed in the MEPS data. Moreover, with an estimated 6-9% decrease in mental health for recent retirees due to lower levels of activity and social interaction (Dhaval et al. 2008), I expect the utilization of mental healthcare to increase for this group. The findings of the aforementioned study along with my findings suggests that there may be an underutilization of mental healthcare among the the recently retired.
Limitations

The uninsured tend to have different risk tolerance, discount rates, and medical risk factors, which makes the inference of causation rather difficult (Anderson et al. 2012). This paper focuses on the near-elderly and elderly, both groups that are relatively at low risk of being uninsured when compared to the general population. Furthermore, this study is likely confounded by the fact that there is significant movement from private to public insurance, which prevents a clean analysis of insurance gain by the previously uninsured. Furthermore, while Medicare does provide a base level of health insurance for individuals over the age of 65 and the permanently disabled, the price and overall economic cost will still prevent many individuals from seeking care.

Conclusion

In this thesis I use the distinct changes generated by the framework of the Medicare program to identify the impact of health insurance coverage status to analyze its effect on yearly individual use of mental health services and total self-expenditure on overall healthcare. The Medicare eligibility threshold at age 65 is associated with an increase in overall insurance coverage and a narrowing of coverage disparities across different subgroups (Card et al. 2008). I find that for individuals that have not yet met the Medicare eligibility threshold total out-of-pocket individual medical expenditure as individual’s age increases at a greater rate ($32.17/year of age) than that of Medicare eligible people. Furthermore, immediately after becoming eligible for Medicare, on average out-of-pocket spending drops by $184.64 overall and the rate of spending is lowered by $10.88 as individuals age one year. On the other hand, I find that both Medicare eligible and non-eligible individuals decrease the number of psychiatrist visits as they age. While the graph displays a noticeable drop in the utilization of psychiatric services at the Medicare eligibility threshold, it should be noted that the p-value for this discontinuity suggests non-significance. My findings, in addition to the findings of other studies, suggest that there is an underutilization of mental healthcare among those eligible for Medicare. My results apply specifically to the near-elderly and elderly as the cross the age boundary for Medicare eligibility, and the results likely cannot be applied to the general population due to the unique characteristics of these two groups.
References


