The Economics of Mental Health

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Note from the Author

Throughout this paper there will be multiple references to "common" mental illnesses and "serious" mental illnesses. The author would like to make it clear that all mental illnesses are serious. However, in order to build on previous research and categorize the different illnesses these terms will be used. In no way is the author trying to insinuate that some mental illnesses are not serious. In fact, the goal of this paper is to show that "common" mental illnesses that have not been studied much in regards to economics are also important and can have a negative association with income.

1. Introduction

The mental health of its citizens is an important topic for any country, but in a country as large and diverse as the United States it takes on even more importance. However, the U.S. has failed when it comes to mental health awareness and mental health care. The U.S. spends about 5.6% of its nationwide health care expenditure on mental health, for a total of about $113 billion each year (NCHS, 2014). This is a large amount of money, and in terms of percentage of GDP it is on par with most other developed nations. However, many Americans still suffer from mental health disorders and many of them do not get the proper help and treatment that they need. Whether this lack of treatment is due to a lack of funding, a stigma surrounding mental illnesses, or an inefficient use of the current spending is not completely known. The most logical assumption is that it has something to do with all three along with other factors not mentioned.

This paper does not seek to explain how and why the United States is doing a poor job treating mental health problems in its citizens. There is plenty of research already focused on these topics. The goal of this paper is to look at mental health from an economic standpoint and look into the harmful effects poor mental health can have on a person's economic position. A person's mental health can have an effect on every part of their life, and their economic position is not immune to the effects of a diminished mental health.

Economics has never been a leading concern when the topic of mental health is breached, and as a result there is not an abundance of research on the effect someone's mental health can have on their economic situation. In turn, mental health funding is usually one of the first things a government will look to cut during times of recessions and austerity. Take the most recent recession in the United States as an example, the National Alliance on Mental Illness reports that states cut $1.8 billion in funding for mental health during the recession (NAMI, 2011). This

paper aims to show that this kind of move is counterintuitive and can have negative effects on people's earnings and as a result the economy as a whole.

2. Literature Review

Mental health is not a subject often mentioned in connection with economics, consequently there is a lack of research centered around the effects of mental health on the economy. However, the research that has been done makes it clear that mental health problems have a definite negative affect on the economy, especially in regards to the earnings of those who suffer from mental health problems. Multiple studies have made the case that mental health problems can be associated with a large decrease in wages. The first research done on the topic was published in 1990 and was commissioned by the U.S. Public Health Service (Rice et al.,1990). This paper, entitled *Economic Costs of Alcohol and Drug Abuse and Mental Illness: 1985* focused more on the economic costs of alcohol and drug abuse, but it also found that mental illness in the United States was associated with an estimated $44.1 billion in lost earnings. A more recent paper from the United Kingdom decided to take a look at how the economy of the United Kingdom would benefit if the government were to increase spending on mental health services (Oxford, 2007). The study found that the cost of helping one person with a mental health problem get off of incapacity benefits and find a job is on average 2500 pounds, but the benefit to the overall economy of that person working is over 33,000 pounds. In 2008 a paper titled *Individual and Societal Effects of Mental Disorders on Earnings in the United States: Results from the National Comorbidity Survey Replication* was published with the goal of updating the paper done by Rice et al (1990) (Kessler et al., 2008). This new paper used a more complete data set and more refined statistical techniques than the earlier study, and came to a

similar but more substantial estimate. The authors estimated that the cost of the reduction in earnings associated with serious mental illness across the economy was around $192 billion. This new study differed from the one published in 1990 in that it used a two-part regression model to better capture the effect of those who had a serious mental illness and no earnings. Along with the change in models, it also used the National Comorbidity Survey Replication data which was much more substantial than the data used in the earlier study. Although the two studies differ in exact techniques and data they both came to the same conclusion that serious mental illness can be associated with a significant loss in expected earnings. These two papers, along with the one from the United Kingdom agree that mental health is a significant issue within an economy.

This paper will build on the results obtained in the papers mentioned early, especially the results found by Kessler et al. (2008). However, it will differ in one major area from the papers mentioned before. All of the papers before looked at the effect of serious mental illness on the economy. The paper from the United Kingdom looked at mental health problems severe enough for the person to qualify for incapacity benefits. The paper by Rice et al. (1990) and the paper by Kessler et al. (2008) looked at serious mental illness defined as having, at any time during the past year, a diagnosable mental, behavioral, or emotional disorder that causes serious functional impairment that substantially interferes with or limits one or more major life activities. Serious mental illnesses were defined to include major depressive disorder, schizophrenia, bipolar disorder, and other mental disorders that cause serious impairment. Although very important to research, it is estimated that only 4.8% of people over the age of 18 in the U.S. are diagnosed with a serious mental illness (SAMHSA, 2016). On the other hand, 42.5 million Americans, or about one in five, suffer from some kind of mental illness every year (SAMSHA, 2016). This subset of people who are suffering with a mental illness, but not one categorized as ‘serious’ are

often overlooked in terms of treatment and research. This paper will use similar techniques and data as Kessler et al. (2008), however it will look at the association between more common mental health problems, such as depression and anxiety, and expected earnings in the U.S.

3. Data Description

The data used in this paper comes from the National Comorbidity Survey of 2001-2002 which is a subset of the Collaborative Psychiatric Epidemiology Surveys from 2001-2003.

The National Comorbidity Survey of 2001-2002 is based on the survey of the same name done in 1990-1991. The National Comorbidity Survey is sponsored by Congress and its overarching goal is to survey psychiatric disorders within the United States. The questions from the survey serve to accrue data about the 'prevalence, risk factors, and consequences of psychiatric morbidity and comorbidity' (ICPSR, 2016).

This paper focuses specifically on data from the National Comorbidity Survey: Reinterview (NCS-2), which is a follow up interview with participants from the initial National Comorbidity Survey in 1990-1991.The goal of the survey was to accrue data on changes in the mental health of these participants over the ten or so years since the first survey. The survey consists of responses from over 5000 people who also participated in the survey from 1990-1991.

Since the reinterview contains information on demographics such as age, gender, region of residence, etc., mental health history, including information on whether or not a participant has a various number of mental health problems, and personal income, it was the perfect data set to consult when trying to discern the effect mental health has on earnings.

The National Comorbidity Survey Replication (NCS-R) was also consulted during research.

Both surveys use the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition and the International Classification of Diseases for diagnostic criteria. However, the variables used in this paper only make use of the variables from the survey that used the DSM-IV as their diagnostic criteria.

Some changes to the data were made in order to ensure statistical techniques were able to be carried out correctly. The main change in the data has to do with the personal income over the past 12 months reported by the participants. Each participant was asked to report which bracket, from 36 possible, best reflected their income over the past year before taxes. In order to allow for a log linear model to run, these results have been changed to the middle of each bracket. For example, if someone reported that they earned between $10,000 and $10,999 then this has been changed to represent an income of $10,500. Most of the brackets were only about $1,000 large (like the one above) so this move is reasonable.

Another change made to the data before running a log linear model is that the income data, which will act as the dependent variable, was log transformed in order to help correct for a positive skew in the data. This is a common transformation done on income data in the United States.

4. Economic Model

A multiple regression model was used to measure the association between mental illness and income. To be more precise, a log linear model was used where the presence of a "common" mental illness, along with some control variables, was used to predict reported personal income over the past 12 months before taxes. The complete model is shown below in figure 1.

Figure 1: log linear regression model predicting ln(income)

$$ln(income) = B_0 + B_1 Age + B_2 Sex + B_3 Region + B_4 Marital\ Status + B_5 Education$$
$$+ B_6 Common\ Mental\ Illness + B_7 Serious\ Mental\ Illness + error$$

The control variables used in the regression model were age, sex, region of residence, marital status, education level, and the presence of a "serious" mental illness. All of these variables are known to be significantly associated with income, so they were included in order to avoid omitted variable bias. These are in line with control variables used in previous research on the association between mental health and income. Again, ln(income) was used in order to correct for a positive skew in the income data. The data was also cleaned to disregard cases where the participant indicated that they were retired or not looking for employment. This left us with a sample size of 3801 participants.

The results from the analysis are shown below in figure 2.

Figure 2: Regression Results

Variable	Estimate	P-value
Intercept	10.66	< 2e-16 ***
Age Squared	0.00004691	4.34e-06 ***
Gender (Male=1, Female=2)	-0.398	< 2e-16 ***
Married	0.07228	0.000136 ***
12 years of education	0.1575	1.80e-05 ***
13-15 years of education	0.3246	< 2e-16 ***
16 or more years of education	0.6728	< 2e-16 ***
Midwest Region	-0.07539	0.004220 **
South Region	-0.1074	2.22e-05 ***
West Region	-0.003673	0.894592
Presence of a "common" mental illness (past 12 months)[1]	-0.0695	0.000663 ***
Presence of a "serious" mental illness (past 12 months)[2]	-0.012	0.769703

These results show that when controlling for age, sex, marital status, region, education, and "serious" mental illness, the presence of a "common" mental illness is a significant predictor for income. After using exponentiation on the estimate of -.0695, we see that when controlling for age, sex, region, education, and "serious" mental illness the presence of a "common" mental illness is associated with a 6.71% reduction in predicted income. This is a substantial decrease in income associated with the presence of a "common" mental illness, and supports the theory that mental illness is associated with a reduction in earnings.

[1] Includes panic attacks, social phobia, specific phobia, agoraphobia without panic disorder, adult separation anxiety disorder, dysthymia, generalized anxiety disorder, hypomania, intermittent explosive disorder, mania, minor depressive disorder.

[2] Includes bipolar I disorder, bipolar II disorder, schizophrenia, major depression, and panic disorder.

In order to look at this association from a more concrete angle, the regression model was used to predict the income of those with a "common" mental illness in a scenario where a "common" mental illness was not present. Their income was predicted given their same demographics but without the presence of a "common" mental illness. The result from this prediction was then compared to their actual reported income. The results from this simulation showed an average increase of $3,626 when the presence of a "common" mental illness was taken out.

This is in line with the results obtained in Kessler et al. (2008), as they found that 'serious mental illness' was associated with about a $16,000 reduction in earnings. Kessler et al. (2008) was looking at 'serious mental illness' and made an adjustment to factor benefits into the earnings amount, so the difference seems reasonable. The lack of significance for the "serious" mental illness variable also makes sense. The model focused on workers in the current workforce, and it was documented in Kessler et al. (2008) that much of the impact of "serious" mental illness came from the fact that it is difficult for people with a "serious" mental illness to work at all.

The results from this model, along with the results from previous research make a strong case that there is a negative association between the presence of mental illness and expected income. While previous studies have already made clear the association between "serious" mental illness and income, the results from the log linear model above provide evidence that there is also a negative association between more common mental illnesses, such as minor depression and anxiety, and expected income.

5. Conclusion

By combining the results of this paper with the results from previous papers it is clear that there is a negative association between mental illness and income. Earlier papers have detailed the association that "serious" mental illness has with income, and this paper has added to those results by finding that "common" mental illnesses also have a significant negative association with income. Hopefully, the results from this paper, and papers like it, can serve to better educate the public about the importance of mental health treatment. Also, results from these types of studies and papers should be referred to when governments are weighing whether or not to cut funding for mental health.

The results from this paper show a negative association between "common" mental illnesses and income. However, the results are not without their limitations. It is difficult to imply causation in any type of research, and this is especially true with the findings of this paper. When viewing the results of this paper it is important to remember that the association, and as a result any causation, can go both ways. With mental health topics it is very difficult to pinpoint the cause and the effect. With regards to this paper, "common" mental illnesses could very well lead to a reduction in income, but it is also true that a reduction in income could lead to mental health issues such as depression and anxiety.

Adding the results from this paper to the catalog of papers on mental illness and economics in no way completes the discussion. There are many more areas to be studied. One area that was not touched upon in this paper is the association between "common" mental illness

and employment. This paper only dealt with people who considered themselves in the workforce, but mental illness could also play a large role in why some people are not in the workforce.

In closing, hopefully this paper can in some small way help add to the discussion about mental health in the United States.

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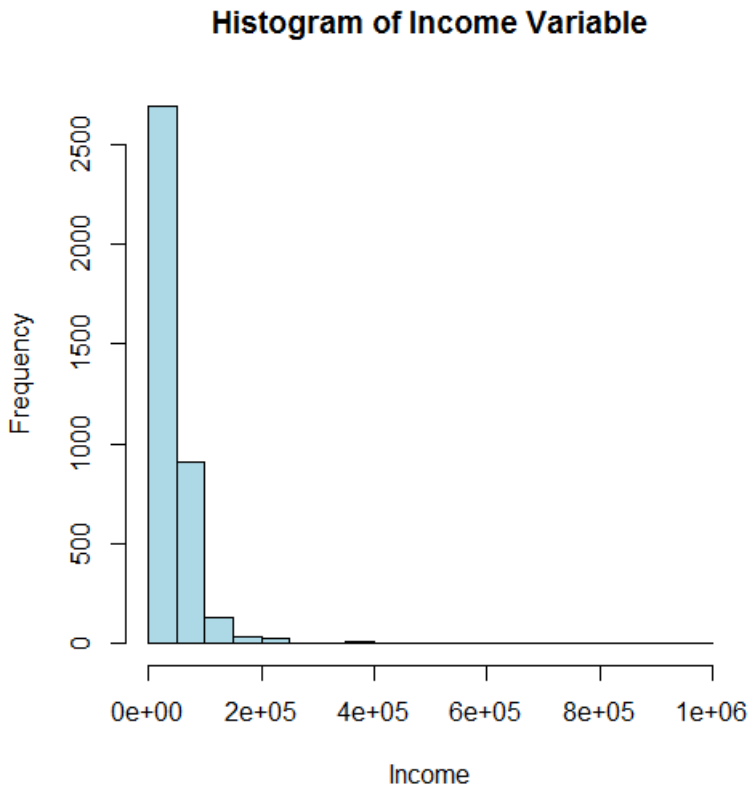
Appendix:

Table 1: *Variable Frequency Information*

Total Sample Size		
3801		
	Total	Percent of Sample
Mental Illness		
"Common Mental Illness"	1188	31.25%
"Serious Mental Illness"	211	5.55%
Control Variables		
Average Age	43	
Male	1990	52.35%
Female	1811	47.65%
Northeast Region	716	18.84%
Midwest Region	1015	26.70%
South Region	1259	33.12%
West Region	811	21.34%
0-11 Years of Education	280	7.37%
12 Years of Education	1022	26.89%
13-15 Years of Education	1168	30.73%
16+ Years of Education	1331	35.02%
Married?	2596	68.30%

Histogram 1: *Income*



Histogram 2: *Log Transformed Income*