

Effect of Medicaid on Mental Health Care Use and Cost

January 2015

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Abstract: We use MEPS data to show that individuals with Medicaid health insurance use more mental health services than those with private insurance but at significantly lower unit costs. We suggest reasons why this might occur and what those reasons imply about methods to reduce Medicaid expenditures across states.

Keywords: Medicaid, mental health services demand, mental health services costs, public mental health services

1. Introduction¹

Medicaid spending has been rising at a steady rate for decades and is projected to continue rising into the foreseeable future. Medicaid is expected to grow from \$200 billion in 2000 to \$1 trillion in 2020, an 8.4% annual growth rate (NHE, 2012). Projected growth rates for Medicare are about the same.

One component of Medicaid expenditures is for mental health services. Mark et al. (2003) reports that between 9% and 13% of all Medicaid dollars are spent on mental health services. Kessler et al. (2001) estimate that more than 25% of U.S. adults had a mental illness in the previous year. The societal costs associated with mental illness are large.² Expenditures for mental health care also are growing rapidly, although, unlike total health expenditures, both the level and growth rate of Medicaid funding are on par with private insurance (SAMHSA, 2012).

For Medicaid, a significant portion of the cost is borne by states, and Medicaid expenditures represent a large and growing portion of state budgets. The median state spent 13.1% of its budget on Medicaid in FY2010 (Kaiser Family Foundation, 2012a). Using state-specific projected growth rates from Kaiser Family Foundation (2012a) and assuming no other components of state government spending increase, the distribution of proportions in FY2020 will move significantly to the right.

¹ The introduction to this paper is very similar to that in Brown, Guo, and Stern (2015) because each discusses a different piece of the same issue.

² See, for example, Greenberg et al.(1993), Kouzis and Eaton (1994), Kessler and Frank (1997), Berndt et al. (1998), Baldwin (1999), Kessler et al. (1999), Marcotte, Wilcox-Gok, and Redmon (2000), Alexandre and French (2001), Greenberg et al. (2003), Chatterji et al. (2005), Frank and Gertler (2007), and McKeithen and Stern (2007).

The Affordable Care Act (ACA) moves a significant number of people from being uninsured to being covered by Medicaid. One immediate question is whether this will increase aggregate health expenditures. Much research has been done to analyze the effect of Medicaid on health cost. Hadley and Holahan (2003) find that privately insured individuals spend significantly more than Medicaid beneficiaries on medical care after controlling for demographics, health status, and income and show that the relevant variation is in prices. Ku and Broaddus (2008) find that out-of-pocket spending under private health insurance is much higher than that under Medicaid. They also discover that the difference in out-of-pocket spending contributes the most to the difference in total medical expenditure. Frees, Gao, and Rosenberg (2011) find that health insurance coverage has a significant positive effect on both the frequency and amount of health care expenditure. But they do not distinguish different types of health insurance. Finkelstein et al. (2012) find, in a randomized sample in Oregon, that provision of Medicaid resulted in more medical care and better self-reported physical and mental health.³

A more interesting question is how, or through what channels, does Medicaid provision affect total health cost. In addition to considering total or out-of-pocket expenditure, it is also important to consider the usage and the cost per service. An increase in total expenditure might be due to the increase in usage, the increase in unit cost per service, or both. Considering both the unit cost and the usage can help to disentangle different channels through which insurance policies can affect the medical expenditure.

The ACA can affect Medicaid expenditure for mental health services in two ways. On the one hand, the ACA will increase the potential usage of mental health service. Medicaid expansion extends the Medicaid eligibility to adults who earn up to 138% of the federal poverty level. According to the federal estimates, in the District of Columbia and the 25 states so far expanding Medicaid, more than 1.2 million people who are uninsured before have some sort of mental illness. Also, starting in 2014, the ACA requires health insurance plans in the individual and small group markets and Medicaid Alternative Benefit Plans to include coverage of mental health and substance use disorder services. Thus, more people will gain access to mental health services through better insurance coverage.⁴ On the other hand, maybe Medicaid can provide mental health services at a lower cost than private insurance.

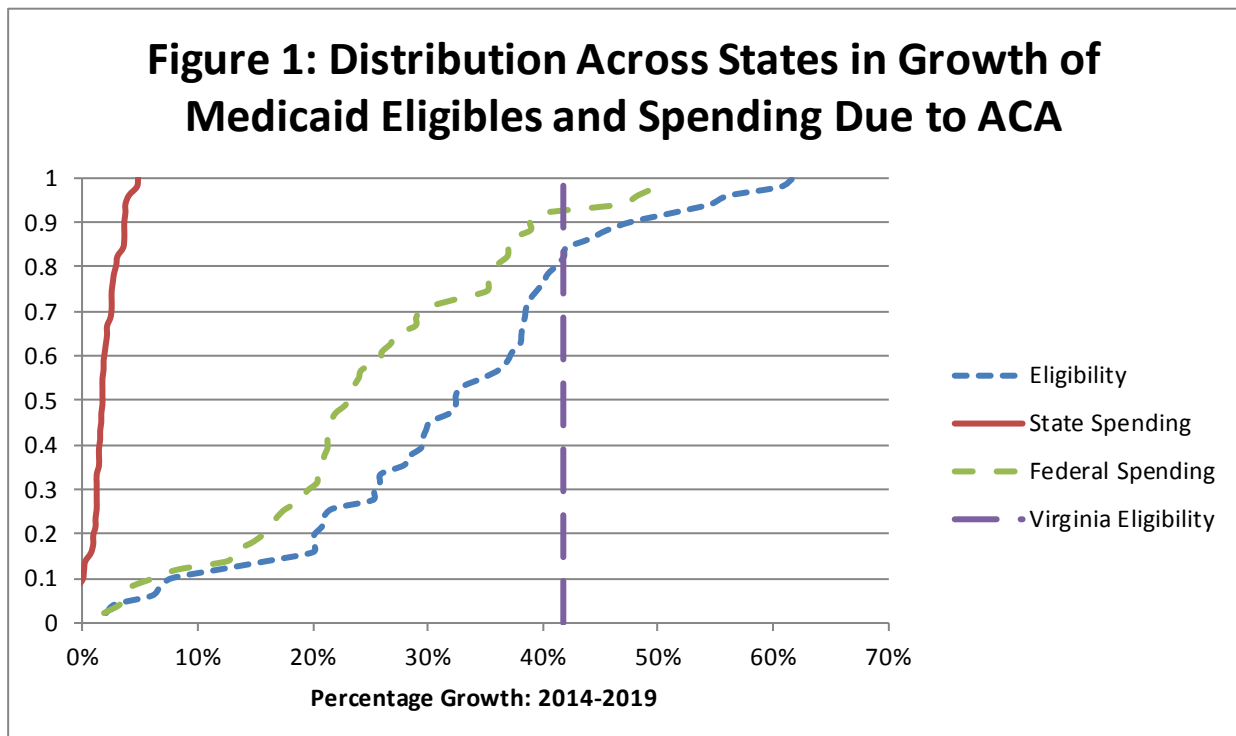
In this paper, we investigate the effects of providing Medicaid on medical expenditure associated with mental health/ substance abuse (MH/SA) services using the Medical Expenditure Panel Survey (MEPS). The MEPS is a national data set with information on insurance provision and medical care usage. Using MEPS, we can compare medical care costs and usage across people with different sources of medical insurance. Similar to both Hadley and Holahan (2003) and Ku and Broaddus (2008), we compare medical expenditure between privately insured individuals, individuals with no insurance, Medicare beneficiaries, and Medicaid beneficiaries. But we focus on units of service and total unit health cost rather than total or out-of-pocket medical expenditure.

³ See, also, Mann and Artiga (2004) and McConnell et al. (2008).

⁴ Sommers et al. (2012a-b), among other papers, show that take-up rates for Medicaid are far from one. Thus, there is a significant issue of how many new eligibles will actually sign up for Medicaid.

Meanwhile, states are looking for ways to slow down or stop growth.⁵ A popular way to do that is to use for-profit managed care organizations (MCOs). In general, managed care initiatives usually define service limits as a means of reducing potential waste and forcing providers to create efficient service delivery plans for consumers; also, they reduce reimbursement rates on high cost services to minimize the use of such services. Presently, across the 50 states, the median proportion of consumers covered by managed care is 75% (Kaiser Family Foundation, 2012b). Based on NASMHPD Research Institute (2012), in 2012, 31 states had managed care systems for Medicaid mental health services, and 12 did not.⁶ The median predicted growth rate of expenditures was 2.87% among the 31 with managed care systems, and it was 3.80% among the 12 with no managed care systems (Kaiser Family Foundation, 2012b).

There are three margins available for reducing Medicaid expenditure: a) reduce the number of people eligible for Medicaid, b) reduce per capita service provision for those eligible, and/or c) reduce unit cost. Because of the Affordable Care Act, the number of people eligible for Medicaid is expected to increase significantly. Thus, (a) is not a meaningful option. In fact, Figure 1 shows the distribution of growth across states in Medicaid eligibility, state spending due to the ACA, and federal spending due to the ACA. The median eligibility growth rate is 32.4%, and the median growth rate in state spending is 1.7%; these compare to growth rates for Virginia of 51.2% and 3.7% respectively (Kaiser Family Foundation, 2012c). Given the goals of managed care reported above, it is clear that Virginia plans to rely on (b) and (c).



⁵ Mark et al. (2011) review trends in public spending on mental health and issues that might affect mental health provision in the near future.

⁶ There were no reported results for California, Georgia, Illinois, Iowa, Missouri, Rhode Island, and South Dakota.

A way to investigate the costs and benefits of Medicaid provision of mental health care benefits to individuals is to use a national data set with information on insurance provision and medical care usage. The Medical Expenditure Panel Survey (MEPS) is such a data set. Using MEPS, we can compare medical care costs and usage across people with different sources of medical insurance. Similar to both Hadley and Holahan (2003) and Ku and Broaddus (2008), we compare medical expenditure between privately insured individuals and Medicaid beneficiaries. But we focus on unit health cost rather than total or out-of-pocket medical expenditure and use different models.

The structure of the rest of this paper is as follows: Section 2 describes the data and models we use to analyze the variation in cost and service provision across different types of health insurance coverage. Section 3 explains the estimation results. Finally, Section 4 discusses implications of the empirical results and concludes.

2. Data and Estimation

We use data from Medical Expenditure Panel Survey (MEPS) to estimate the difference in total per unit cost and number of units of service consumed by people who are covered by private health insurance versus those who are covered by Medicaid. MEPS is a survey of families and individuals, their medical providers, and their employers, and it provides information on individual total medical expenditure. We collect information about each respondent's medical expenditure on Mental Health or Substance Abuse (MH/SA) condition from two parts of the 2007 survey: the 2007 Event Level Conditions (ELC) and the 2007 Full Year Consolidated (FYC). The ELC file records the conditions reported by an individual respondent, and, for each condition, the number of events/visits for six types of services: home health care, hospital inpatient stays, hospital outpatient visits, office-based visits, hospital emergency room visits, and prescribed medicines. The MEPS uses ICD-9-CM codes to code the conditions, and then regroups them into CCS codes. Following Brown (2011), we choose conditions with CCS codes 650-662, and 670 as MH/SA conditions.

The FYC file contains information on each respondent's mental health status, health insurance coverage, and demographic variables, such as age, gender, marital status, race, religion, and education. It also records information on the respondent's medical expenditure on those six types of services listed above. In this file, medical expenditure is the amount of money directly paid to health care providers during the year 2007. It includes separately out-of-pocket payments and payments by various health insurance sources. Thus medical expenditure in the MEPS measures total cost of health care.

Our sample includes individuals over 18 years old and with a MH/SA condition. As seen in Table 1, we exclude those individuals have missing data on mental health status and family income. In this paper, we include family income as an explanatory variable rather than individual income because family income is probably more relevant concerning health care. The sample used to analyze the variation in number of treatments across people with different health insurance coverage includes 3299 individuals. To analyze the variation in average cost per treatment, we exclude individuals with missing data on average cost per treatment, either because of missing data on number of total treatments or because of missing information on total medical expenditure. The sample for cost analysis includes 1403 individuals.

Table 1: Sample Selection Criteria for the MEPS Sample

Cause	# Obs Lost	Proportion of Total	# Remaining
			3822
Missing data on family income	90	0.024	3732
Missing data on mental health diseases	433	0.113	3299
Missing data on cost per visit	1896	0.496	1403
Number Remaining in Sample for # of treatments analysis	3299	0.863	
Number Remaining in Sample for unit cost analysis	1403	0.367	

We use two dependent variables: a) the number of events/treatments associated with MH/SA conditions for each individual, and b) the log of average total cost per event.⁷ The first two columns of Table 2 provide the sample moments for the variables to be used in the analysis of variation in total cost per unit service associated with MH/SA conditions across people with different health insurance coverage. The first two columns of Table 2 provide the sample moments for the variables⁸ to be used in the analysis of variation in log total cost per unit service associated with MH/SA conditions across people with different health insurance coverage. Many papers in the literature interested in explaining the effects of health insurance on direct health cost for consumers choose out-of-pocket medical expenditure as the outcome variable. Most of the literature focusing on the total cost of medical care chooses not to decompose total cost into the number of units of service and the cost per unit.⁹ In this paper, we care about how different health insurance coverage choices affect total social cost of health care, and we choose total cost per unit service (unit cost) as the dependent variable. In this sample, we exclude people who have no treatment for MH/SA conditions or people whose total expenditure on MH/SA conditions is zero. The sample size is 1403. The sample moments show that there exist large variations in both unit cost and family income across individuals.

⁷ See, for example, Diehr et al. (1999) for a discussion of issues associated with measuring unit and total costs.

⁸ The variable "Mental Health Problem" measures an individual's mental health status and is constructed by the variable K6SUM42 in MEPS. In MEPS, there are six mental health-related questions, using the "K-6" scale developed by Kessler et al. (2003). These questions assess the individual's non-specific psychological distress during the past 30 days. K6SUM42 is a weighted sum of six variables where weights measure intensity of problem. The "mental health problem" variable is (approximately) continuously increasing with the probability of having a mental health problem.

⁹ In discussions of relevant empirical methods, neither Diehr et al. (1999) nor Dunn et al. (2003) nor Lee, Liu, and Sales (2006) ever mention unit cost.

Table 2: Moments of MEPS Variables

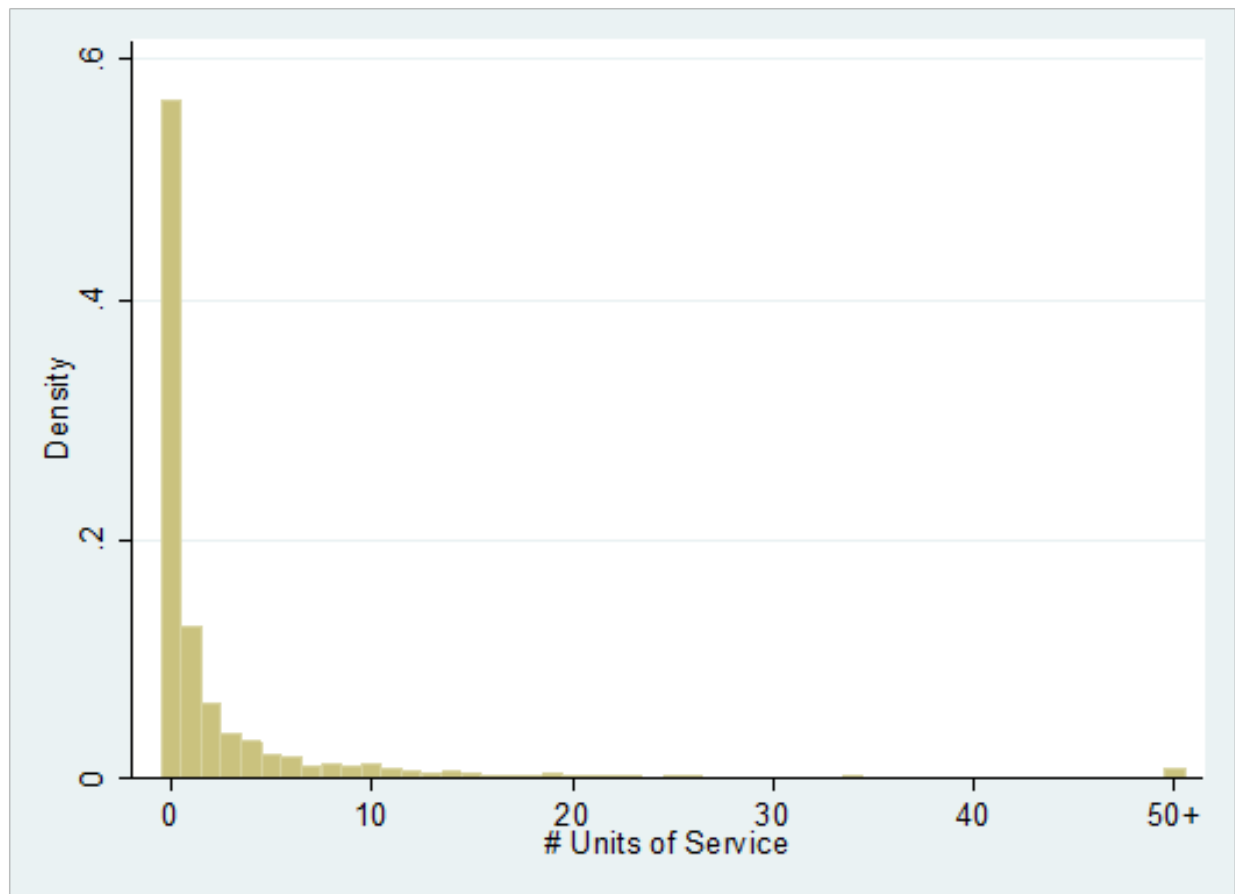
Variables	Avg. Unit Cost		# Treatments	
	Mean	Std Dev	Mean	Std Dev
log(Unit Cost)	4.748	0.967		
# Treatments			3.535	10.262
Age/10	5.021	1.764	4.959	1.726
ln(Family Income)	10.356	1.047	10.454	1.010
Race/Ethnicity				
White	0.811	0.392	0.820	0.379
Hispanic	0.165	0.371	0.166	0.373
Other	0.054	0.226	0.057	0.232
Region				
Midwest	0.236	0.422	0.236	0.425
South	0.356	0.479	0.373	0.484
West	0.247	0.432	0.250	0.433
Male	0.346	0.476	0.343	0.475
Married	0.448	0.497	0.492	0.500
Education			2.309	0.020
GED/HS	0.444	0.497	0.478	0.499
BA/BS	0.135	0.342	0.136	0.343
Master/Doctoral	0.077	0.267	0.073	0.260
Others	0.089	0.285	0.085	0.279
Mental Health Problem	0.346	0.255	0.295	0.244
Type of Health Insurance				
Private	0.527	0.499	0.562	0.496
Medicare	0.321	0.467	0.276	0.447
Medicaid	0.289	0.454	0.217	0.412
Other Public	0.041	0.199	0.045	0.208

The sample is not representative of population in several ways. It includes more male, elder, and white people. Also, it has lower private health insurance coverage rates (0.53 vs 0.65) and higher Medicare (0.32 vs 0.14) and Medicaid (0.29 vs 0.16) coverage rates than those of U.S. population.¹⁰ The coverage rates might be different because of the oversampling of elderly people in MEPS. The last two columns of Table 2 provide the sample moments for the variables to be used in the analysis of variation in number of health care treatments associated with MH/SA conditions across people with different health insurance coverage. Figure 2 shows the distribution of individual choices about number of treatments, and it is clear that most individuals choose no service. This occurs frequently in the count literature (e.g., Mullahy, 1998; Deb and Trivedi, 2002; Tooze, Grunwald, and Jones, 2002) and is referred to as an excess of zero counts in the data. Following the literature (e.g., Pohlmeier and Ulrich, 1995; Diehr et al., 1999; Bao, 2002; Buntin and Zaslavsky, 2004; Elhai, Calhoun, and Ford, 2008; Frees, Gao, and Rosenberg,

¹⁰ Statistics for the U.S. population statistics and health insurance coverage rates comes from DeNavas-Walt, Proctor, and Smith (2011).

2011), we consider the possibility that the process that generates the excess zeros is different from the one that generates positive count values.¹¹ Thus, we use a zero-inflated Poisson model to examine the effects of demographic variables and health insurance coverage on people's choice of number of units of treatment. The zero-inflated Poisson model uses a logit model for the process that determines an individual's decision to receive any mental health treatment, and it uses a Poisson specification for positive units.¹²

Figure 2: Density of # Units of Service



¹¹ This model is frequently called a two-part model. Manning et al. (1981), Pohlmeier and Ulrich (1995), and Diehr et al. (1999), among others, motivate the two-part model by suggesting that the patient might be making the Bernoulli participation decision and the physician the Poisson count decision. However, many other structures could generate the same two-part model (e.g., search costs of finding a provider, gatekeeper considerations).

¹² We also experimented with a zero-inflated negative binomial model, but STATA failed to converge. Gilleskie and Mroz (2004) suggest a semiparametric specification for medical expenditures, and Tooze, Grunwald, and Jones (2002) use a random effects model with cross-section data from MEPS and Santos Silva and Windmeijer (2001) construct a model to handle multiple sickness spells and estimate it using data from one wave of the German Socioeconomic Panel. Mello, Stearns, and Norton (2002) model the choice of insurance type and treat it as endogenous. Deb and Trivedi (2002) suggest that the critical break in structure is at a level greater than zero.

3. Results

Table 3 provides estimates of the effect of various individual characteristics on log unit health care cost. The key variables are the effects of having different types of health insurance on unit cost relative to having no insurance. The results show that unit costs are higher for people with all types of insurance (though the estimates for Medicare and Medicaid are not statistically significant). The difference between private health insurance and Medicaid is $0.256 - 0.081 = 0.175$, and the associated t-statistic is 2.15, implying that people with private health insurance pay more for the same medical services than people with Medicaid. This result is consistent with Hadley and Holahan (2003). For private insurance relative to Medicare, the difference is $0.256 - 0.043 = 0.213$ with an associated t-statistic of 2.10. These results suggest that:

- Unit costs for mental health services provided at CSBs¹³ are, on average, lower than the same services provided by private providers (see Hadley and Holohan, 2003 for similar results). The lower rates occur because a) reimbursable rates are higher with private insurance than they are with Medicaid;¹⁴ the difference may reflect quality differences to some degree; and c) with Medicaid, the provider cannot recoup copayments and deductibles as one can with private insurance. The estimate in Table 3 is about the effect of having Medicaid on medical costs, not the effect of receiving services at a CSB. However, Medicaid recipients are very likely to receive services at a CSB. This is partially because Medicaid pays for many services, especially psycho-social rehabilitation services, that are in high demand, especially among people with chronic mental illness or SMI, that typically are not paid for by private insurance plans. Such services are rehabilitative in nature and are geared towards this population.¹⁵ Some examples of non-traditional services include but are not limited to residential treatment, intensive in-home services, therapeutic day treatment services and mental health support services. The estimates in Table 3 show significant unexplained variation in unit costs across CSBs. But the results in Table 3 show that average costs are lower.
- Efforts to move people with mental health problems away from CSB services to services provided by private providers has little promise for reducing Medicaid and/or state mental health expenditures except in those cases where unit costs are unusually high. Decker (2012) provides evidence that most private providers do not accept new Medicaid patients, and Decker (2009) and Ku et al. (2011) suggest Virginia will have significant difficulty increasing supply of private providers needed for Medicaid expansion without significant increases in Medicaid payment rates. If much of the variation is caused by fixed costs associated with large, low-demand services, then consolidation of small CSBs will be much more effective than privatization. However, to the degree that people in rural areas struggle to find mental health services (Hauenstein et al., 2007), consolidation may exacerbate the problem.

¹³ Even though not all states use CSBs and the MEPS data set is a national data set, we use "CSB" throughout as short-hand for "public provider of mental health services."

¹⁴ Holmes and Deb (1998) provide evidence that mental health care provided by non-physicians has lower unit costs and total costs than that provided by physicians (including psychiatrists). Thus, to the degree that CSBs use a mix of providers more heavily weighted towards non-physicians, their costs can be lower.

¹⁵ Private health insurance tends not to pay for these services because of their rehabilitative nature.

Table 3: MEPS log Unit Cost

Variable	Estimate	Std Err	Variable	Estimate	Std Err
Male	0.166 **	0.054	Education		
Age/10	-0.015	0.084	GED/HS	0.019	0.069
(Age/10) ²	0.004	0.008	BA/BS	-0.010	0.098
Race/Ethnicity			Master/Doctoral	-0.032	0.118
White	-0.237 **	0.080	Other	0.030	0.106
Other Race	-0.179	0.134	ln(Family Income)	0.036	0.032
Hispanic	-0.137 *	0.076	Mental Health Problem	0.121	0.110
Region			Type of Health Insurance		
Midwest	-0.053	0.083	Private	0.256 **	0.071
South	-0.083	0.077	Medicare	0.043	0.082
West	0.030	0.082	Medicaid	0.081	0.074
Married	0.051	0.058	Other Public	0.379 **	0.130
			Constant	4.268 **	0.392

Notes:

1) Sample size: 1403

2) Double-starred items are statistically significant at the 5% level, and single-starred items are statistically significant at the 10% level.

Most of the other explanatory variables are not statistically significant with respect to unit cost. The exceptions are male (0.166) and white (relative to black) (-0.237). Many studies (e.g., McCrone et al., 1998; Byford et al., 2001) construct unit cost measures in such a way that they can not vary with demographic characteristics. However, Lee, Liu, and Sales (2006) estimate that blacks receive 29% less ambulatory care than whites and spend 51% less on total care, implying that blacks have unit costs that are approximately 22% lower; this is the opposite of our estimate.¹⁶ They did not impute the change in unit cost themselves and thus never analyzed or conjectured why blacks would have lower unit costs. One possibility is that whites have better access to care, thus leading to lower prices for whites.¹⁷ However, blacks might use lower quality care, thus leading to lower prices for blacks. We think this issue deserves more attention, but it is not the focus of this paper.

Table 4 provides two sets of estimates for the effect of individual characteristics on units of treatment. We estimate logit parameters associated with the extensive margin whether to receive any mental health services,¹⁸ and we estimate Poisson count parameters associated with the intensive margin. The most important effects for this paper are those associated with health insurance. The results show

¹⁶ Duan et al. (1983) also estimate models for both number of visits and total expenditure which would allow one to perform a similar analysis. However, they include no race variables in their analysis.

¹⁷ Padgett et al. (1994) provide evidence that minority groups with good private insurance receive less mental health care, even after controlling for other factors. This might suggest the existence of barriers to entry which could possibly lead to higher prices for those who do receive service.

¹⁸ The dependent variable is one iff the individual uses mental health services.

that people with private health insurance (0.231), Medicare (0.281), and Medicaid (0.628) are more likely to use mental health care services than people without insurance. On the other hand, taking into account the intensive margin (Poisson regression), people with Medicare (0.045) and Medicaid (0.288) use more mental health services than those without insurance, while people with private insurance use less services (-0.075). There are two conflicting effects here: a) people with health insurance of any type can receive mental health services at lower out-of-pocket rates, making it more likely they will demand such services. On the other hand, people with mental health problems may find it more difficult to work at a job providing private insurance and/or navigate government bureaucracy to successfully apply for government-provided insurance. The results suggest that the latter effect dominates for the extensive margin (i.e., whether to receive any mental health service), but the former effect dominates for the intensive margin (how many units of service to receive). The difference between the estimates for private health insurance and Medicaid is $-0.075 - 0.288 = -0.363$ with an associated t-statistic of -12.40, suggesting that people on Medicaid use more service than those with private insurance. While this might occur because of other unobserved factors correlated with both Medicaid receipt and mental health problems, it also suggests that the demand for mental health services is price-elastic and mental health services with Medicaid is free (see, for example, Goldman et al., 1995; Diehr et al., 1999; Gilleskie and Mroz, 2004). The results for Medicare are consistent with this in that price is higher and Medicare limits mental health care provision in other ways.¹⁹ The last two columns of Table 4 provide average marginal effects for each of the explanatory variables, combining the logit effect and the Poisson effect. Since almost all of the logit and Poisson effects have the same sign within a variable, there are no large surprises in the average marginal effect results.

Besides the insurance variables, there are a number of other variables that have statistically significant effects. With respect to the extensive margin (Logit Estimates), people in the South (-0.329) and married people (-0.192) are less likely to use mental health care services, and people with high mental health problem scores (1.370) are more likely. With respect to the intensive margin (Poisson Regression Estimates), Hispanics (-0.078) and people of race other than white or black (-0.271), married people (-0.213), high school dropouts use fewer services, and people in the North, people with higher income (0.031), and people with high mental health problem scores (1.425) use more services. One should note that, since we are controlling for severity of illness with the "mental health problem" variable, the estimates associated with type of insurance should be interpreted as effects holding constant severity; i.e., these estimates do not suffer from differences in severity distributions across different types of insurance. In a somewhat different model, Hadley and Holohan (2003) find similar, though statistically insignificant results with respect to total medical expenditures for people in the South, married people, Hispanics, and people of race other than white or black.

Ku and Broaddus (2008) provide evidence that spending on total health care declines by 20.8% when changing insurance coverage from private insurance to Medicaid holding constant other characteristics. Our estimate of the same change for just mental health services is the percent decline in unit cost (from

¹⁹ Medicare pays for "clinic option" services but not for "state plan option" services. For example, clinic option services for Region Ten, one of the CSBs in Virginia, represent 0.8% of revenues.

Table 4) of 17.5% plus the percent increase in units of treatment of 55% $[(2.069-0.123)/3.535]$,²⁰ resulting in an increase in spending of 27.9%.

Table 4: MEPS # Units of Treatment

Variable	Logit Estimates		Poisson Regression Estimates		Estimated Average Marginal Effect	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Male	0.054	0.078	0.056 **	0.020	0.288 *	0.148
Age/10	-0.218 *	0.124	-0.010	0.031	-0.399 *	0.233
(Age/10) ²	0.022 *	0.012	-0.003	0.003	0.027	0.023
Race/Ethnicity						
White	-0.147	0.120	0.026	0.028	-0.152	0.226
Other Race	-0.328 *	0.194	-0.271 **	0.053	-1.303 **	0.309
Hispanic	-0.121	0.112	-0.078 **	0.027	-0.481 **	0.210
Region						
Midwest	-0.228 *	0.123	-0.428 **	0.028	-2.393 **	0.301
South	-0.329 **	0.115	-0.582 **	0.026	-2.023 **	0.284
West	-0.214 *	0.123	-0.423 **	0.027	-2.353 **	0.302
Married	-0.192 **	0.083	-0.213 **	0.022	-1.074 **	0.159
Education						
GED/HS	-0.144	0.102	0.155 **	0.026	0.259 *	1.630
BA/BS	0.182	0.141	0.476 **	0.037	2.144 **	0.303
Master/Doctoral	0.277	0.171	0.691 **	0.042	3.593 **	0.459
Other	0.211	0.156	0.473 **	0.037	2.187 **	0.337
ln(Family Income)	-0.024	0.046	0.031 **	0.012	0.069	0.087
Mental Health Problem	1.370 **	0.162	1.425 **	0.038	7.329 **	0.336
Type of Health Insurance						
Private	0.231 **	0.097	-0.075 **	0.027	0.123	0.187
Medicare	0.281 **	0.126	0.045	0.028	0.629 **	0.232
Medicaid	0.628 **	0.108	0.288 **	0.026	2.069 **	0.202
Other Public	-0.060	0.180	-0.088 *	0.052	-0.412	0.351
Constant	0.181	0.562	1.495 **	0.146		

Notes:

1) Sample size: 3299

2) Double-starred items are statistically significant at the 5% level, and single-starred items are statistically significant at the 10% level.

²⁰ The numerator is the difference in marginal units of treatment from Table 4, and the denominator is the average # treatments from Table 2.

3.1 Effects of Endogeneity Bias

In our estimation methodology, we ignore issues concerning the possible endogeneity of type of insurance coverage. It is not obvious what we could use as an instrument especially since we have very limited geographical information. Pohlmeier and Ulrich (1995) ignore endogeneity issues and argue that they are not important because (in Germany) people have very little choice about insurance. Bao (2002) ignores the issue and provides no discussion, and Frees, Gao, and Rosenberg (2011) mention it but do not address the problem. Methods such as those suggested by Hamilton (1999) and Alfò, Maruotti, and Trovato (2011) provide ways to handle endogeneity. But one needs instrumental variables to implement them. Goldman et al. (2002) claim to control for endogeneity but do not provide enough detail to determine how or whether their instruments are valid. Mello, Stearns, and Norton (2002) control for endogeneity by using geographical variation in health insurance choices as an instrument. Such a choice is not available for us because we do not observe geography. Zhang et al (2008) look at the effect of selection bias among Medicaid recipients associated with participating in a particular voluntary insurance plan within Medicaid. Hellinger and Wong (2000) look at selection bias issues associated with participation in HMOs.

Sommers et al. (2012b) present evidence that there is significant variation in Medicaid take-up rates across states, varying "from 43.0% in Arkansas and Louisiana to 82.8% in Massachusetts, after adjusting for population demographics." Participation in Medicaid was a function of disability and of state program characteristics such as the cost sharing rules for beneficiaries, generosity of benefits, use of asset tests, and use of managed care programs for Medicaid populations. The existence of such large state effects (along with estimates of them in Sommers et al. (2012a, 2012b)) could serve as a good instrument. However, one would have to observe geography in the data to use it, and the public access version of MEPS provides no such information.²¹

Unfortunately, the fact of relatively low take-up rates suggests some endogeneity of Medicaid take-up. CSBs help uninsured potential clients sign up for Medicaid to get better mental health services. For example, in Virginia, case management services are defined as "assist individuals and their family members to access needed services that are responsive to the individual's needs. Services include: ..., assisting the individual directly to locate, develop, or obtain needed services and resources, ..." (Virginia DBHDS, 2014). Levinson and Rahardja (2004) provide evidence that there is significant stigma (e.g., Moffitt, 1983) associated with Medicaid participation. This implies a tradeoff between stigma and the utility one receives from Medicaid benefits, implying endogeneity. Thus, bias caused by endogeneity is a real issue.

If the unobserved individual factors causing Medicaid take-up are positively correlated with the unobserved individual factors causing more usage of mental health services and causing usage of more expensive mental health services, then the estimated effects of the Medicaid participation in this paper

²¹ Ham, Ozbeklik, and Shore-Sheppard (2010) also estimate a model of Medicaid take-up but use no state-specific policy variables. In fact, none of their explanatory variables are good candidates for instruments because they would not be excluded from the medical care usage equations.

are upwardly biased.²² In this application, we expect such correlation if there is any correlation. Thus, to the extent that such bias exists, we should view our estimates of the effect of Medicaid participation on mental health service usage and mental health service unit cost as upper bounds.

4. Implications and Conclusion

We examine differences in service usage and unit cost per service of mental health care for those receiving public (especially Medicaid) and private health insurance by using a cross-section data, MEPS. Although our analysis controlled for variables like family income, health status, education, and other demographic characteristics that associate with both health insurance coverage and health spending, we cannot control for possible unobserved factors associated with both insurance and health spending. This is a common problem for research using non-experimental data or experimental data with significant attrition.

We estimate that mental health services financed by Medicaid are 17.5% less expensive than those financed with private health insurance. The lower rates occur because reimbursable rates are higher with private insurance than they are with Medicaid. With respect to units of service provision, our results show that insurance coverage increases service provision. Thus, to the degree that it increases insurance coverage, the Affordable Care Act (ACA) will lead to large increases in demand for mental health services. If, as estimated by Pugh (2014), the ACA moves 1.2 million people with mental health problems from having no insurance to being covered by Medicaid,²³ then the increase in service demand is 2.483 ($=1.2 \times 2.069$)²⁴ million more service units. If a managed care organization (MCO) can induce those uninsured individuals to behave like owners of private insurance, then the increase in service demand is instead 0.147 ($=1.2 \times 0.123$) million, a savings of 2.336 million units of service. However, much of this reduction is due probably to services that are covered by Medicaid and not by private insurance (or Medicare) and thus should be included in the effects only if one considers having the extra services no longer covered. Unfortunately, we have no way to decompose the reduction in service usage between those that might be relevant to the introduction of an MCO and those that would not because the required data on detailed service provision is not available in MEPS (or any other data set we know of).

Ku and Broaddus (2008) provide evidence that spending on total health care declines by 28% when changing insurance coverage from private insurance to Medicaid, holding constant other characteristics. Our estimate of the same change for just mental health services is the percent decline in unit cost (from

²² See Stern (2015) for a more rigorous argument on this point.

²³ This includes demand only in those states that have implemented Medicaid expansion. A large number of people would move to a health exchange. For the purposes of this analysis, we will treat them as receiving service from private providers and thus not affect the analysis.

²⁴ The 2.069 term is the average marginal effect from Table 4 of moving from being uninsured to having Medicaid.

Table 3) of 17.5% plus the percent increase in units of treatment of 55% $[(2.069-0.123)/3.535]$,²⁵ resulting in an increase in spending by 27.9% $(=((1-0.175)\times(1+0.55))-1)$.

Overall, our results suggest that Medicaid expansion will increase the total mental health care spending. Although the unit cost will decrease, the service usage will increase more. Our findings are different from those reported by Hadley and Holohan (2003) and Ku and Broaddus (2008) who find that Medicaid is a less expensive way of providing health insurance than private insurance. However, to a great extent, the results are not easily comparable because there are large differences in the questions being asked and the question-specific methods being used.

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²⁵ The numerator is the difference in marginal units of treatment from Table 4, and the denominator is the average number of treatments from Table 2.

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