

HOW DO ECONOMIC SHOCKS AFFECT FAMILY MENTAL HEALTH SPENDING?

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ABSTRACT

Using two-year panel data from the Medical Expenditure Panel Survey for the period 2004 to 2012, we examine the effect of economic shocks on mental health spending by families with children. Estimating two-part expenditure models within the correlated random effects framework, we find that employment shocks have a greater impact on mental health spending than do income or health insurance shocks. Our estimates reveal that employment gains are associated with a lower likelihood of family mental health services utilization. By contrast employment losses have positive effect on total family mental health spending. Our results also indicate that mental health spending on behalf of fathers is largely unaffected by economic shocks.

Keywords: mental health, mental health spending, economic shocks, family financial status

JEL classification: I1, D1

I. INTRODUCTION

Mental health spending is an important component of total health care spending by the US population. According to the Agency for Healthcare Research and Quality (AHRQ 2016a), an estimated \$86 billion was spent on the treatment of mental disorders making it third most costly medical condition among those ranked by AHRQ. Despite the sizeable spending on mental health services, treatment for mental health conditions is relatively low: only half of those who experience mental illness receive treatment (Han et al. 2015). Among those with unmet need, not being able to afford the cost of care is the most commonly reported reason for not receiving mental health (Han et al. 2015). Consequently, the availability of financial resources and thus, ability to pay for mental health care, is likely play a critical role in mental health service utilization.

Since families tend to pool financial resources, spending decisions made on behalf of family members should be considered in the context of family-level decision making. For example, in constrained financial circumstances resulting from a decline in its economic status, the loss of income may require the family to re-prioritize its spending decisions, both overall and with regard to spending on specific family members. Thus, an economic shock may have implications for the family's total health care spending, its use of specific medical care services such as mental health care, as well as who within the family obtains medical care.

When considering spending on mental health services, the family's response to an economic shocks is likely to be complex. On the one hand, it has been well-documented that loss of economic status may cause stress and anxiety which can have a significant impact on the mental health status of family members, leading to new or more profound depressive episodes within the family, and potentially, to drug and alcohol abuse and even suicide to cope with such

trauma (S. Burgard 2012; Catalano et al. 2011; Goldman-Mellor et al. 2010). As a result, families may prioritize their spending on mental health services and shift spending from other health services and sources of consumption. On the other hand, some families may view spending on mental health problems as more discretionary in nature and thus able to be postponed or neglected. Ultimately, the response of family mental health spending to altered economic circumstances will depend upon whether changes in income and/or out-of-pocket costs are significantly large to alter the family's willingness to pay for mental health services. Underlying this change will be decisions by the family on how much to spend overall on health care and what proportion, if any, should be allocated to mental health care, and whether family members with mental health symptoms receive priority in spending decisions.

In this paper, we examine how changes to the family's economic status, such as losses of income, employment, and health insurance, affect spending by the family on mental health services. Our analysis considers several aspects of how family mental health spending responds to such economic shocks. First, we consider the impact of economic shocks on the family's total spending for mental health care. Next, we consider how the family's mental health spending for prescription drug and ambulatory services are affected by economic shocks. Finally, we consider whether parents or children are given priority with regard to mental health spending when the family faces an economic change.

We implement each of these analyses by using two-year panel data from the Medical Expenditure Panel Survey (MEPS) for the period 2004 to 2012, measuring the impact of these economic shocks on changes in the family's mental health spending over the two-year observation periods. To obtain within-family changes in mental health spending over this observation period, we apply the correlated random effects econometric model (described in

detail below). The analysis thus provides a unique perspective on how a critical aspect of family health care use responds to changes in its economic status.

We find that family mental health spending is more sensitive to employment shocks than to income or health insurance shocks, particularly among two-parent families. Our findings indicate that mental health spending in single-mother families may be more sensitive to income losses than in two-parent families. We find that gaining employment may lead to a decline in the likelihood of family mental health spending. We also find that economic shocks appear to have much larger effect on ambulatory mental health spending than on mental health prescription medication spending. Finally, our results also indicate that mother's mental health spending is affected by economic shocks to a greater degree than father's mental health spending.

II. BACKGROUND

Families confronting economic shocks resulting in a loss of economic status face difficult financial decisions as they seek to protect their living standards. Family responses range from increasing its cash inflow, such as drawing on liquid or financial assets (B. Chen and Stafford 2016) and drawing on home equity (Hurst and Stafford 2004), to reducing various components of consumption. The latter decisions are particularly complex since more than half of the average family's budget consists of items that tend to remain fixed due to the prior consumption commitments (Chetty and Szeidl 2007). For instance, budget categories, such as housing expenditure, could be costly to adjust in the short run while budget categories, such as food expenditure, may prove to be more easily adjustable. The substantial share of prior consumption commitments in a family's budget puts additional pressure on families to where possible, reduce health care spending in response to an economic shock.

Several existing studies document that mental health spending is likely to decline due to dwindling financial resources at the time of adverse economic shocks. Using the 2006-2010 waves of the National Health Interview Study S. A. Burgard and Hawkins (2013) find that a greater share of adults report foregoing mental health care due to affordability during the Great Recession (December 2007 to June 2009) than during the pre-recession period. Similarly, using the 2000-2009 waves of the Medical Expenditure Panel Survey (MEPS), J. Chen and Dagher (2016) find that during the Great Recession patients with depressive and/or anxiety disorders shifted mental healthcare utilization shifted away from more costly physician visits and toward less costly prescription drug utilization. Consistent with the notion of shifting away from more costly toward less costly mental health services, Modrek et al. (2014) find that a higher local unemployment rate is associated with a lower likelihood of inpatient visits and a higher likelihood of outpatient visits.

However, economic shocks are likely to influence mental health spending not only through diminished financial resources but also through increased demand for mental health services. For instance, research finds that financial and employment insecurity as well as wealth losses can increase the risk of self-reported depressive symptoms (Bradford and Lastrapes 2014; Catalano et al. 2011; McInerney et al. 2013). Similarly, increases in the local unemployment rates were found to be associated with increased likelihood of psychological distress (Charles and DeCicca 2008), neurosis (Christopher Ruhm 2003), and suicide (Christopher Ruhm 2000). Displaced workers are more likely to report being in fair or poor mental health and report depression or anxiety symptoms (Schaller and Stevens 2015). Likewise, lower family income was found to be associated with higher likelihood of child depression and antisocial behavior (Strohschein 2005).

If families are able to prioritize their health care spending (Karaca-Mandic et al. 2014; Karaca-Mandic et al. 2013) to address ongoing mental health problems or the onset of mental health symptoms, reported depressive symptoms may have a reduced likelihood of manifesting into clinical mental health problems. To date, there is very limited evidence of such compensatory behavior. Bradford and Lastrapes (2014) find evidence that changes in regional unemployment rates led to an increase in mental health prescription drug use, although this was observed only for patients in the Northeast US census region. Similarly, Currie and Tekin (2015) find that living in communities with high rates of housing foreclosure is associated with a higher likelihood of seeking treatment in hospitals and emergency rooms for mental health conditions.

To summarize, it appears that negative economic shocks may impose two opposing influences on mental health spending: pressure to decrease spending due to liquidity constraints, and pressure to increase spending due to worsening mental health status¹. More generally, this is reflective of health being both a consumption good and an investment good (Grossman 1972). The literature on consumption smoothing suggests that spending on health care services that are more reflective of investments in health, such as spending on preventive services, are likely to decline in response to economic shocks than treatment services (Kristensen and Andersen 2016).

Our study expands the research noted above in several ways. First, we concentrate on *family* mental health *spending* rather than on utilization of specific services by individuals. Second, by performing a family-level analysis of health care spending, we explicitly recognize families tend to share financial resources and that individual-level analyses are agnostic regarding the implications for how the family responds to economic shocks. Third, we *directly measure changes in family economic status* in contrast to several previous studies that relied on

¹ According to Grossman model it also possible that unemployment may decrease the opportunity cost of time and can lead to a greater household production of health which may imply the upward pressure on mental health spending.

time period dummies as proxies for economic shocks, and perform analyses separately for two-parent and single-mother families. Finally, we consider how families adjust their mental health spending to economic shocks by examining the *within-family change* in mental health spending over the two-year MEPS observation period. We do so by controlling for unobserved, time-invariant differences in characteristics across families through the correlated random effects approach that provides estimates comparable to the application of family-level fixed effects in a linear model (Chamberlain 1980; Mundlak 1978; J. M. Wooldridge 2010; Imbens and Wooldridge 2007; J. Wooldridge 2013).

III. DATA AND METHODS

This paper utilizes data from the Medical Expenditure Panel Survey-Household Component (MEPS). The MEPS is a series of two-year panel data sets based on a nationally representative subsample of households that participated in the prior year's National Health Interview Survey. Our analytical data set pools data from eight of these panels: from the 2004-2005 panel to the 2011-2012 panel. Respondents in each of the panel are surveyed five times over a period covering two calendar years and data is obtained regarding their demographic characteristics, health status, health care spending and utilization, health insurance coverage, income, and employment status. Follow-back surveys of physicians, hospitals, and pharmacies identified by respondents provide more complete information on spending and utilization.

III.A. Sample

Since this paper investigates various aspects of how the family's mental health care spending responds to changes in its economic status, including the question of whether parents or children are given priority when the family faces an economic change, we limit our sample to families *with children*. We also require that all family members are present in the data for both

years of a two-year panel. The definition of family used in this study is based on the Current Population Survey definition where all family members are related by marriage or by birth².

We impose several additional sample restrictions. First, we exclude families with individuals age 65 years or older from the sample. Since such families typically have members covered by Medicare, they are less likely than families with non-elders to be affected by an economic shock that would compromise their health care spending. Second, we excluded families with children ages 19 or older from the analytic sample. These children are transitioning to young adulthood and starting to develop their independence are potentially less likely to be affected by an economic shock experienced by their parents. Third, since the initial onset of mental disorders usually occurs in childhood or adolescents (R. C. Kessler et al. 2007) and following the existing literature (Stagnitti 2015) we limit the sample to families with at least one child five years of age or older. Finally, we drop families with missing data on important family economic and demographic characteristics. These exclusions resulted in a sample of 5,194 two-parent and 2,665 single-mother families with at least one child age 5 year old and older participating in two year MEPS panels.

III.B. Mental health spending

Mental health spending includes expenditures associated with treated mental health conditions in the MEPS: “The conditions reported by respondents were recorded by interviewers as verbatim text which were then coded by professional coders to fully specified ICD-9-CM codes. These codes were regrouped in clinically homogenous categories known as CCS codes. Conditions with CCS coded 650 – 670 (mental health) were used in the paper”³(Zibman 2014). Using the CCS to ICD-9-CM code crosswalk located in the MEPS documentation, we identify

² This definition excludes non-married partners, foster children, and in-law relatives.

³ CCS refers to Clinical Classification Software developed by AHRQ. ICD-9-CM refers to the International Classification of Diseases, Ninth Revision, Clinical Modification.

the following mental health conditions: adjustment disorder, anxiety disorder, attention-deficit, conduct, and disruptive behavior disorder, delirium, dementia, and amnesic and other cognitive disorders, developmental disorders, disorder usually diagnosed in infancy, childhood, or adolescence, impulse control disorders, mood disorders, personality disorders, schizophrenia and other psychotic disorders, alcohol-related disorders, substance-related disorders, suicide and intentional self-inflicted injury, screening and history of mental health and substance abuse codes, miscellaneous disorders (eating disorders, factitious disorders etc).

The mental health conditions were then linked to the health care events to calculate the associated expenditures. Health care events include “hospital inpatient care, ambulatory care provided in offices and hospital outpatient departments, care provided in emergency departments, paid care provided in the patients home (home health), and the purchase of prescribed medications” (Zibman 2014).

Mental health spending includes all mental health and substance abuse-related expenditures from office-based visits, hospital outpatient department visits, emergency department visits, inpatient hospital stays, and prescription medications, and were estimated using methods described in Zuvekas (2005). These estimates include treatment provided by both specialists and non-specialists encompassing services for the treatment of disorders covered by ICD9 codes 291, 292, and 295–314 from the International Classification of Diseases, Ninth Revision/Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Since the full year MEPS Household data files do not provide data on expenditures for mental health services, we obtained such expenditures from the MEPS medical event files. These files contain information on hospital inpatient stays, emergency room visits, outpatient office-based provider visits, home health visits, prescription medications, and other medical expenditures. We

aggregated the event-level data on mental health spending to the person-level and then further aggregated these person-level data to obtain family-level mental health spending. Mental health spending variables are all deflated by Personal Health Care Expenditure (PHCE) component of the National Health Expenditure Accounts(AHRQ 2016b). All values are in constant 2012 dollars.

Our analysis also focuses on two of the most frequently used mental health services: mental health ambulatory care and prescription drug medications. Ambulatory visits include office-based and outpatient hospital visits reported by households related to care for mental health conditions or substance abuse. Prescription drug medications include prescription medications associated with mental health conditions. The information on the cost of prescription medications comes from Medical Provider Component of the MEPS. Finally, to examine whether parents or children are given priority when the family faces an economic change we calculate total mother's mental health spending, total father's mental health spending, and total children's mental health spending.

III.C. Economic shocks

To assess the impact of actual changes in a family's economic status over the two-year observation periods, we examine changes in family income, employment status, and health insurance status over the two-year observation period within each MEPS panel. With regard to income changes, we include dummy variables indicating family income relative to the federal poverty line in each year, specifically, whether the family is poor or near-poor (less than 125% of the federal poverty line (FPL)), low income (125% to 200% of the FPL), middle income (200% to 400% of the FPL), with high income (400% of the FPL or more) as the reference group⁴.

⁴ Movement across these income categories over time represents significant income shifts. For example, moving from the income threshold of four times the FPL in 2011 for a family of four to the threshold for

We also characterize the family's employment status during each year of the two-year panel with a set of dummy variables. These variables indicate whether any parent in the family was continuously employed during the year, lost employment during the year, gained employment during the year, or was continuously without employment during the year (the reference category). These groups are not entirely mutually exclusive since multiple job transitions are possible throughout the year. For single-mother families, the above variables characterize the mother's employment experience over the two-year observation period while for two-parent families, these variables characterize the combined experience of both the mother's and father's employment, (e.g., whether any or both parents experienced an employment change).

Finally, we also account for changes in the family's health insurance status over each year in the two-year panel⁵. We do this with a dummy variable indicating whether all family members were insured during the year compared to a reference category of whether at least one family member was uninsured at some point during the year.

III.D. Demographic and family characteristics

Demographic and family characteristics included in the analysis are maternal race and ethnicity, mother's educational attainment, mother's age, age of the youngest child, number of

three times the FPL represents an income loss of over \$20,000 (\$89,400 to \$67,050). Such a dramatic shift is not likely to be captured using a continuous measure of income which most accurately provides marginal changes in income. The disadvantage in using the FPL measure is that we can miss some significant changes within FPL classes.

⁵ Health insurance is potentially endogenous in models of health care spending. Our data lack adequate candidates to instrument for family health insurance status since typical candidates – employment status, worker industry and occupation, and health status – are also likely to be correlated with the outcome of interest, family or individual mental health spending. Thus we include health insurance in our model because of its importance as a determinant of health spending, but also examine the sensitivity of our findings when it is excluded.

children in the family, and region of residence. We also indicate whether any child or parent in the family is in fair or poor health status.

Statistical Approach

There are two main statistical challenges in the analysis of health care spending data including mental health spending data. First, a non-trivial proportion of the population does not use health services during a given year and thus report zero health care spending. Second, since relatively few families have very high levels of health care spending, the distribution of spending is positively skewed. Since we are interested in both the likelihood that the family will incur mental health spending and the level of spending conditional on the family having mental health expenditures, we estimate a two-part generalized linear model (GLM) (Bao 2002; Nguyen et al. 2015; Le Cook et al. 2010; Monheit et al. 2009). In the first part of the model, we apply a probit regression to estimate the probability that the family incurs mental health spending. In the second part of the model, we apply the GLM model to estimate the level of spending conditional on positive family mental health spending. GLM expenditure models typically employ a logarithmic link function to relate the estimated conditional mean to the vector of explanatory variables, and to address the skewness in the expenditure distribution. The GLM model also requires specification of a variance function for the conditional mean, such as the Poisson, Gamma, or Inverse Gaussian distributions. We discuss the selection of the variance function below.

To estimate the within-family change in mental health spending over our two-year observation periods we must control for unobserved heterogeneity across families in our sample⁶. To control for such unobserved or omitted family-specific effects while avoiding the

⁶ There are three main frameworks for incorporating unobserved effects: fixed effects, random effects, and correlated random effects (CRE) ((J. M. Wooldridge 2010)). The fixed and random effects approaches has been primarily developed in the context of linear models and are not as easily applicable in the context of nonlinear models

incidental parameters problem, we estimate the two-part model using the correlated random effects (CRE) framework (Chamberlain 1980; Mundlak 1978; J. M. Wooldridge 2010; Imbens and Wooldridge 2007; J. Wooldridge 2013). Similar to applying family fixed effects, CRE framework allows for dependence between the unobserved effect and the observed explanatory variables. However, unlike the fixed effects framework this dependence is not arbitrary: CRE framework typically models the dependence between the unobserved effect and the observed explanatory variables⁷. Following Mundlak (1978) and Chamberlain (1980) we assume that the dependence between the unobserved effect and the observed explanatory variables is the conditional normal distribution with linear expectation and constant variance. This approach has been applied to various nonlinear models, including probit models (J. M. Wooldridge 2010), fractional response models (Papke and Wooldridge 2008), and two-part models (Mora et al. 2015).

Using the statistical approaches described above, we estimate the two-part GLM with the log link function and the gamma distribution (or inverse Gaussian distribution, where appropriate) within CRE approach. To select the link function and distribution function we conducted a series of tests. The modified Park test (Park 1966) was used to estimate the relationship between the mean and the variance of the conditional spending. This test is based on regressing the squared residuals from a GLM on predicted spending (Manning and Mullahy 2001). The Park test indicates that the conditional variances for nearly all outcomes for both two-parent and single-mother subsamples are proportional to the square of the conditional mean (coefficient is close to 2) which corresponds to the Gamma function. For two outcomes (child

⁷ Before the term correlated random effects became widely used this modeling approach would be referred to as random effects or fixed effects interchangeably (Gardiner et al. 2009; J. M. Wooldridge 2010)

mental health spending and total family ambulatory mental health spending) in the two-parent subsample the Park test indicates that the conditional variances for the outcomes are proportional to the cube of the conditional mean (coefficient is close to 3) which corresponds to the inverse Gaussian function.

Finally, following Jones et al. (2012) we employ the Hosmer-Lemeshow test and the Tukey-Pregibon test to examine the goodness-of-fit of the logarithmic link function. The Hosmer-Lemeshow test is based on regressing the errors of predicted spending on dichotomous variables for the deciles of the prediction. The coefficients for the decile indicator variables were not jointly significant which indicates the logarithmic link function is the appropriate function to be used. The Tukey-Pregibon test checks linearity of response on the scale of estimation.

Equation specification: The first part of the two-part model to predict the probability of any mental health services use in family i in year t of the panel and is specified as a CRE probit:

$$Prob(MH_Spending_{it} > 0) = \Phi(\beta_0 + \beta_1 Income_{it} + \beta_2 Employment_{it} + \beta_4 HealthIns_{it} + \beta_5 X_i + \beta_6 Region_i + \beta_7 Year_t + \beta_8 Avg_Income_i + \beta_9 Avg_Employment_i + \beta_{10} Avg_Employment_i + \beta_{11} Avg_HealthIns_i)$$

where Φ represents the standard normal cumulative distribution function. Variables $Income_{it}$, $Employment_{it}$, $HealthIns_{it}$ reflect income, employment, and health insurance status of family i in year t of the panel. These are key variables that measure economic shocks experienced by families. Following J. Wooldridge (2013), we implement the CRE approach by including the average value of these time-varying variables in each of our two-year panels. We also include time-invariant variables (J. Wooldridge 2013) reflecting mother's race, ethnicity, educational attainment, number of children in a family, and ages of mother and of a youngest child at the baseline of the panel.

The second part, GLM model with a log link and gamma distribution (or inverse Gaussian distribution for the models focusing on child mental health spending and total family ambulatory mental health spending in two-parent families) predicts the level of mental health spending conditional on having any mental health spending in family i in year t of the panel:

$$\begin{aligned} \text{Log}(E(MH_Spending_{it} | MH_Spending_{it} > 0)) = & \beta_0 + \beta_1 Income_{it} + \beta_2 Employment_{it} + \beta_4 HealthIns_{it} + \\ & \beta_5 X_i + \beta_6 Region_i + \beta_7 Year_t + \beta_8 Avg_Income_i + \beta_9 Avg_Employment_i + \beta_{10} Avg_Employment_i + \\ & \beta_{11} Avg_HealthIns_i \end{aligned}$$

Similar to the estimate of our probit model, we include time averages of economic shock variables into regression analysis. The two-part models are estimated using estimation routine developed by Belotti et al. (2015)⁸. All models apply our constructed MEPS family weights, and adjust standard errors for the clustered sampling design of the MEPS.

IV. RESULTS

IV.A. Descriptive Statistics

As described above, the sample analyzed in this study consists of eight two year MEPS panels. Table 1 describes characteristics of the first year for two-parent and single-mother families averaged over eight panels. Single-mother and two-parent families differ markedly in their socio-economic status. For example, about four of ten single-mother families are poor or near poor while in contrast, only one in ten two-parent families are poor or near poor. Similarly, single mothers are less likely than parents in two-parent families to be continuously employed throughout the entire year. However, the percent of families where parent(s) experience job loss or job gain appears to be similar for both types of families (about 10%). Compared to parents in two-parent families, single mothers are disproportionately more likely to lack health insurance coverage, more likely to African-American, and to have lower educational attainment.

⁸ Note that this routine estimates the CRE probit model via pooled maximum likelihood estimator.

Table 2 shows that about roughly equivalent percentages of single-mother and two-parent families (27.8% and 29.3% respectively) incur mental health spending. Median total family mental health spending among families incurring expenditures is \$832 for two-parent families and \$1,087 for single-mother families. For both types of families, mean mental health spending substantially exceeds median mental health spending, consistent with expectations that the expenditure data are highly skewed. Prescription medications and ambulatory care are the two most frequently used types of mental health services. About 24% of both types of families incurred spending on mental health-related prescription medications. About 18% of two-parent and about 21% of single-mother families had spending for ambulatory mental health care services.

IV.B. Economic Status and Mental Health Spending

Table 3 describes family mental health spending by family economic status at the first year of the two-year panel period. Although mental health spending is similar between single-mother and two-parent families, substantial differences exist as well. For instance, in both single-mother and two-parent families the percentage of families utilizing mental health services is higher among families where everyone is insured throughout the year than in families where some or all family member have uninsured spells during. However, there are also substantial differences by family structure in the association between the family's employment status and mental health spending. For instance, single-mother families where at least one parent is not employed throughout the year are most likely to have spending for mental health services. By contrast, two-parent families exhibit small differences in the likelihood of mental health spending according to parent's employment status. Considering the same section of Table 3 that examines the relationship between parental employment and mental health spending among two-

parent families, we notice that the group of families where at least one parent lost employment has the lowest mean and median mental health spending and also the highest mental health services utilization rate.

IV.C. Economic Shocks and Total Family Mental Health Spending: Econometric Estimates

Tables 4 depict the average marginal effects of economic shocks on the total family mental health spending among two-parent and single-mother families. Total family mental health spending is reported in Table 4 via three different outcomes. The first two outcomes are (1) the likelihood of any family mental health spending and (2) the level of spending for those families using mental health services. The third outcome combines the marginal effects of the first two outcomes to form (3) the total expected family mental health spending. All results in Table 4 are based on estimates of the two-part model (estimates of both equations are presented in Appendix Tables A1-A3).

There are several important results highlighted in Table 4. First, among two-parent families, employment shocks seem to have a much stronger effect on mental health spending than changes in income or health insurance status. Second, *employment gains* are associated with a *decline* in both the *likelihood* of mental health services utilization and in the *amount* being spent toward mental health services among those who use the services. Combined these effects imply that gaining employment in two-parent families where a parent was not employed during entire year is associated, on average, with an expected decline of \$172 in the family mental health spending. Among single-mother families gaining employment and continuing to be employed throughout the two-year observation period is associated with an expected decline of \$307 in family mental health spending. The effect of an employment gain leading to a lower

mental health services use is consistent with the hypothesis that gaining employment may improve mental health and thereby lead to a decreased demand for the services.

Third, *employment losses* are associated with an *increase* in both the *likelihood* of mental health services utilization and in the *amount* being spent toward mental health services among those who use the services. For instance, losing employment after a recent employment gain increases the likelihood of mental health services utilization by about five percentage points. We also find that losing a job and remaining jobless for the remainder of the two-year observation period leads to an increase of \$204 in expected family mental health among two-parent families. The sign of the employment loss effect may reflect pressure to increase mental health spending due to the possibility of worsening mental health status when a family member loses employment (S. Burgard 2012; Catalano et al. 2011; Goldman-Mellor et al. 2010).

Fourth, there are two statistically significant effects of an income loss on the amount of total family mental health spending: a decline from high income to middle-income status in two-parent families leads to an increase in mental health spending and a decline from middle-income to low-income status in two-parent families leads to a decrease in mental health spending. Similar to the employment loss effects, the opposite signs of these income loss effects may reflect two opposing influences on mental health spending we described above: pressure to decrease spending due to liquidity constraints faced by middle income family when they become low income, and pressure to increase mental health spending due to the possibility of worsening mental health status when high income family becomes middle income.

Fifth, we do not find any statistically significant effects of health insurance loss on family mental health spending. Finally, Tables 4 indicate that mental health spending in single-mother families appears to be much less sensitive to economic shocks than in two-parent families. The

employment gain effect described above is the only statistically significant effect of economic shocks on total family mental health spending among single-mother families.

IV.D. Mental Health Ambulatory Care and Mental Health Related Prescription Medications Spending

Tables 5 and 6 focus on the average marginal effects of economic shocks on spending for two of the most frequently utilized types of mental health services: mental health related prescription medications and mental health ambulatory care. Tables 5 and 6 indicate that spending on ambulatory mental health care is much more sensitive to economic shocks than spending on mental health related prescription medications. We find only two statistically significant effects of economic shocks on prescription medication spending. Consistent with results discussed above, we find that a gain in employment is associated with a five percentage point decline in the likelihood of mental health prescription medication spending while an employment loss is associated a four percentage point decrease in such spending.

In comparison, economic shocks appear to have much larger effect on ambulatory mental health spending. Consistent with prior results we find that employment gains are associated with a decline in ambulatory mental health spending. For instance, among single-mother families gaining employment and continuing to be employed throughout the two-year observation period is associated with an expected decline of \$312 the ambulatory mental health spending. However, employment losses may have two opposite influences on ambulatory mental health spending. Employment loss after being employed for over a year leads to a decrease in the expected ambulatory mental health expenditure of \$156 among single-mother families. However, losing a job and remaining jobless for the remainder of the two-year observation period has the opposite

effect. It leads to an increase of \$108 in the expected ambulatory mental health among single-mother families.

IV.E. The Role of Pre-Existing Mental Health Condition

To control for spending differences over time that might be due to pre-existing mental health conditions, the baseline model presented in Table 4 is augmented by adding a set of variables reflecting family mental health status during the first year of the panel. First, the baseline model is augmented by two dummy variables showing whether there was at least one family member with a mental health issue and whether there were two or more family members with mental health issues. Second, the baseline model is augmented by a set of variables indicating which family members have mental health issues. Third, the baseline model includes dummy variables indicating the specific mental health condition present in the family: for children: significant behavioral impairment, as reflected by *Columbia Impairment Scale* ; for adults(or parents): severe psychological distress, as reflected by *Kessler 6 (K6)* scale (R. Kessler et al. 2002); depression symptoms as measured by *Patient Health Questionnaire-2* (Kroenke et al. 2003); or fair/poor self-reported mental health status. As observed in Appendix Table A1, including various measures of family mental health status at the first year of the panel does not alter results substantively.

IV.F. Are Both Parents and Children Affected by Economic Shocks?

We do not find statistically significant effects of economic shocks on children among either single-mother families or two-parent families with one exception. Among children in two-parent families, we find that recent parental loss of employment may increase the likelihood of children's use of mental health services by three to five percentage points. It appears that parent'

spending on mental health is more sensitive to economic shocks than children's spending on mental health.

Table 7 describes the relationship between economic shocks and mental health spending on mothers and fathers in two-parent families. These models consider how parents prioritize their mental health spending during periods of economic shocks. It appears that mother's mental health spending is more sensitive to economic shocks than father's mental health spending. For instance, earlier we showed that losing a job and remaining jobless for the remainder of the two-year observation period leads to an increase of \$203 in the expected *family* mental health among two-parent families. Table 7 indicates that about \$99 of this increase is due to an increase in *mother's* mental health spending while *father's* mental health spending increases by statistically insignificant amount of \$4. Similarly, Table 4 reveals that a decline from middle-income to low-income status in two-parent families leads to \$222 decline in the expected *family* mental health spending among two-parent families. Table 7 indicates that \$108 of this decline in expected *family* mental health spending is due to a decline in *mother's* mental health spending. Expected father's mental health spending appears to be unchanged. Thus, in two-parent families, father's mental health spending is largely unaffected by changes in family economic circumstances. There are only two exceptions. Similarly to mothers, fathers in these families where a parent gains employment after a not being employed for over a year decreases their likelihood of mental health services utilization by about two percentage points. Also, fathers in low-income families that become poor or near-poor increase their conditional mental health spending by about \$610.

Table 7 also shows that a gain in health insurance is associated with an increase of \$155 in expected maternal mental health spending. Overall, Tables 4-7 indicate that there seems to be a lack of a health insurance effect on mental health spending. One of the possible reasons for this

is lack of mental health parity in health insurance coverage. The 1996 Mental Health Parity Act had several loopholes that allowed to insurers circumvent the legislation. To cover these loopholes the mental health parity legislation was extended twice: in 2008 and in 2010. Thus, for the most part of the 2004-2012 time period, we focus on many health insurance plans still lacked the parity in coverage. Thus, smaller effects of health insurance coverage on mental health spending during this time period could, in part, be due to a lower level of mental health benefits coverage.

V. SUMMARY

Using the Medical Expenditure Panel Survey, this study has examined the effect of economic shocks on the within-family change in mental health spending over a two-year period. We considered three types of economic shocks reflecting changes in income, employment and health insurance coverage, and obtained several important findings. First, our results indicate that family responds stronger to employment shocks than to mental health or health insurance shocks. The lack of a family mental health spending response to gains and losses in health insurance coverage may be partially due to the lack of parity between mental health benefits and medical/surgical benefits through the most part of the study time period.

Second, we find that gains in employment are associated with a decline in the likelihood of mental health services utilization for both two-parent and single-mother families. A gain in employment also leads to a decline in mental health prescription medication services over our two-year observation period.

Third, we find that employment and income losses may have both positive and negative effect on mental health spending. As we discussed above, this is consistent with the notion that adverse economic shock may negatively affect both mental health status as well as availability of

financial resources. Forth, we find that ambulatory mental health services are affected by economic shocks to a greater degree than prescription medication mental health services. Finally, we find that mother's mental health spending is affected by economic shocks to a greater degree than father's mental health spending.

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Table 1: Sample Descriptive Statistics: Two-Parent and Single-Mother Families

Variables	Two-parent families	Single-mother families
Income		
poor or near poor: <125% poverty line, %	10.65	38.69
low income: [125; 200)% poverty line, %	12.38	22.04
middle income:[200; 400)% poverty line, %	36.69	26.78
high income: >=400% poverty line, %	40.28	12.49
Employment		
Any parent		
not employed all year long, %	27.90	15.54
employed all year long, %	95.81	67.73
gained employment during a year, %	10.49	10.60
lost employment during a year, %	9.03	9.79
Health insurance		
everyone in the family IS insured ALL year long, %	74.84	58.50
at least one family member not insured all year long, %	25.16	41.50
Maternal race and ethnicity		
White non-Hispanic, %	72.16	48.95
Black non-Hispanic, %	6.22	30.11
Other race, non-Hispanic, %	6.95	4.41
Hispanic, %	14.67	16.53
Maternal educational attainment		
Less than high school, %	9.69	15.58
High school diploma or GED, %	25.14	33.80
Some college, %	25.75	30.29
College degree, %	39.42	20.34
Mother's age, years	39.97	37.66
Age of the youngest child, years	8.20	9.24
Number of children in the family	2.11	1.76
Region of residence		
Midwest, %	23.24	23.24
Northeast, %	18.60	18.60
West, %	22.73	22.73
South, %	35.43	35.43

Note: The analytic sample used pools eight two year MEPS panels. This table describes sample characteristics based on year one of each panel.

Table 2: Family Mental Health Spending and its Components: Two-Parent Families and Single-Mother Families

	Two-parent families	Single-mother families
Family mental health spending		
Any spending, in...		
... year 1, %	27.80	29.34
...only in year 1, %	5.23	7.03
...only in year 2, %	6.65	7.26
...both year 1 and year 2, %	22.58	22.31
...neither year 1 nor year 2, %	65.55	63.4
Amount of spending by families with mental health spending		
Mean, 2012 dollars	2,338.09	2,372.23
Median, 2012 dollars	832.90	1,087.49
Family prescription medication mental health spending		
Any spending, in...		
... year 1, %	24.05	24.40
...only in year 1, %	3.67	5.06
...only in year 2, %	5.65	6.13
...both year 1 and year 2, %	20.37	19.34
...neither year 1 nor year 2, %	70.31	69.47
Amount of spending by families with prescription medication mental health spending		
Mean, 2012 dollars	1,143.56	1,378.63
Median, 2012 dollars	655.01	640.52
Family ambulatory mental health care spending		
Any spending, in...		
... year 1, %	17.97	21.02
...only in year 1, %	7.12	7.33
...only in year 2, %	6.37	8.07
...both year 1 and year 2, %	10.85	13.69
...neither year 1 nor year 2, %	75.66	70.92
Amount of spending by families with ambulatory mental health spending		
Mean, 2012 dollars	1,144.76	1,163.99
Median, 2012 dollars	350.58	520.56

Notes:

- a) The analytic sample used pools eight two year MEPS panels. Table 2 describes mental health spending based on year one of each panel.
- b) Total family mental health spending, family prescription medication mental health spending, and family ambulatory mental health care spending are all deflated by Personal Health Care Expenditure (PHCE) component of the National Health Expenditure Accounts.

Table 3: Family Mental Health Spending and Economic Status*

	Two-parent families			Single-mother families		
	Any, %	Mean**, dollars	Median**, dollars	Any, %	Mean**, dollars	Median**, dollars
Income						
poor or near poor: <125% poverty line	24.54	2,020.74	874.23	31.50	3,082.39	1,260.06
low income: [125; 200)% poverty line	25.73	1,776.53	794.22	25.15	2,087.63	951.74
middle income:[200; 400)% poverty line	29.87	2,742.53	755.55	29.17	1,617.82	770.96
high income: >=400% poverty line	27.42	2,173.89	872.69	30.38	2,059.47	1,254.71
Employment						
Any parent						
not employed all year long	30.38	2,503.16	939.68	47.68	3,692.06	1,625.03
employed all year long	27.41	2,352.84	805.11	25.18	1,808.62	951.74
gained employment during a year	28.58	2,087.45	925.38	28.46	2,631.31	1,069.10
lost employment during a year	33.12	1,765.61	791.24	30.33	2,169.31	968.41
Health insurance						
everyone in the family IS insured ALL year long	29.92	2,434.71	842.86	32.07	2,566.793	1,069.10
at least one family member not insured all year long	21.52	1,938.65	695.82	25.48	2,026.928	1,108.33

*The analytic sample used pools eight two year MEPS panels. Table 3 describes sample characteristics based on year one of each panel.

**Mean and median spending are calculated for subsample of families with positive spending.

Table 4: Expected Average Marginal Effects of Economic Shocks on Total Family Mental Health Spending.

	Two-parent families			Single-mother families		
	Probability of any spending	Conditional spending	Expected spending	Probability of any spending	Conditional spending	Expected spending
Income loss						
...low income family becomes poor or near poor family	.0087 (.0196)	-35.19 (488.24)	9.13 (142.76)	.0180 (.0233)	77.46 (395.89)	62.21 (112.97)
...middle income family becomes low income family	.0094 (.0163)	-850.35** (361.76)	-221.72** (103.21)	.0019 (.0272)	285.56 (430.24)	88.12 (125.08)
... high income family becomes middle income	-.0053 (.0151)	566.62* (337.12)	149.96 (99.54)	.0155 (.0377)	-400.57 (437.16)	-83.81 (129.83)
Gaining employment...						
...after a not being employed for over a year	-.0467*** (.0159)	-244.78 (298.66)	-172.35** (80.18)	-.0180 (.0303)	644.60 (500.82)	150.11 (125.73)
... in year 1 and continuing to be employed for over the entire two year period	.0091 (.0292)	-81.98 (565.73)	-3.42 (167.03)	.0074 (.0341)	-1103.00** (516.05)	-307.96* (167.89)
Losing employment...						
... after being employed for over a year	.0411 (.0296)	-415.38 (637.70)	-28.22 (184.08)	.0180 (.0313)	390.66 (418.62)	154.27 (129.29)
... after a recent employment gain	.0502** (.0198)	-497.36 (398.04)	-31.64 (115.41)	.0255 (.0271)	-712.34 (461.69)	-153.69 (139.39)
... and continuing being not employed for over a year	-.0035 (.0164)	742.14** (333.91)	203.99** (97.09)	-.0075 (.0318)	67.74 (359.33)	3.58 (91.96)
Everyone in the family becomes insured	.0184 (.0203)	283.51 (414.92)	121.23 (122.64)	.0073 (.0281)	266.27 (322.34)	94.31 (92.63)

Notes: * Significant at 10% level; ** Significant at 5% level; *** Significant at 10%;

Average marginal effects were calculated based on regression models presented in Appendix Tables A1;

Table 5: Expected Average Marginal Effects of Economic Shocks on Prescription Medication Mental Health Spending.

	Two-parent families			Single-mother families		
	Probability of any spending	Conditional spending	Expected spending	Probability of any spending	Conditional spending	Expected spending
Income loss						
...low income family becomes poor or near poor family	.0161 (.0194)	136.56 (148.38)	52.91 (38.59)	.0113 (.0205)	96.06 (183.97)	37.94 (43.62)
...middle income family becomes low income family	.0084 (.0163)	-53.43 (123.16)	-3.64 (30.67)	.0225 (.0257)	80.58 (213.17)	48.01 (44.28)
... high income family becomes middle income	-.0004 (.0138)	-182.26 (169.43)	-46.13 (41.98)	.0207 (.0341)	-29.96 (279.41)	18.17 (68.59)
Gaining employment...						
...after a not being employed for over a year	-.0479*** (.0128)	127.14 (125.87)	-23.91 (31.80)	-.0206 (.0275)	204.22 (300.19)	25.52 (59.55)
... in year 1 and continuing to be employed for over the entire two year period	-.0081 (.0278)	-196.67 (174.81)	-58.66 (43.82)	.0063 (.0300)	12.01 (262.70)	10.79 (55.99)
Losing employment...						
... after being employed for over a year	.0465 (.0291)	-70.33 (215.74)	36.44 (50.69)	.0050 (.0284)	-159.90 (249.52)	-33.70 (57.43)
... after a recent employment gain	.0383** (.0169)	-267.00 (198.73)	-22.22 (48.57)	.0113 (.0247)	-147.89 (272.35)	-22.91 (58.81)
... and continuing being not employed for over a year	.0096 (.0145)	139.86 (174.52)	46.14 (42.63)	.0092 (.0280)	-56.33 (211.50)	-2.61 (42.44)
Everyone in the family becomes insured	.0133 (.0141)	-61.04 (140.04)	0.23 (34.06)	.0347 (.0233)	87.10 (190.61)	64.71 (44.52)

Notes: * Significant at 10% level; ** Significant at 5% level; *** Significant at 10%;

Average marginal effects were calculated based on regression models presented in Appendix Tables A2;

Table 6: Expected Average Marginal Effects of Economic Shocks on Ambulatory Mental Health Spending.

	Two-parent families			Single-mother families		
	Probability of any spending	Conditional spending	Expected spending	Probability of any spending	Conditional spending	Expected spending
Income loss						
...low income family becomes poor or near poor family	.0212 (.0205)	-210.25 (382.96)	-11.25 (66.10)	-.0232 (.0242)	-125.29 (259.12)	-51.22 (53.27)
...middle income family becomes low income family	-.0136 (.0194)	80.97 (549.15)	-2.19 (90.55)	.0171 (.0291)	303.33 (250.07)	82.82 (54.01)
... high income family becomes middle income	.0120 (.0138)	-153.02 (307.18)	-12.36 (54.17)	.0386 (.0395)	-1120.75*** (276.13)	-198.63*** (65.87)
Gaining employment...						
...after a not being employed for over a year	-.0237 (.0166)	-132.36 (250.36)	-51.73 (42.60)	.0221 (.0301)	114.65 (263.13)	47.83 (55.35)
... in year 1 and continuing to be employed for over the entire two year period	-.0100 (.0308)	79.04 (825.28)	1.79 (134.91)	-.0470 (.0350)	-1229.54*** (420.94)	-312.09*** (104.46)
Losing employment...						
... after being employed for over a year	.0485* (.0292)	608.79 (694.45)	165.13 (115.40)	.0526* (.0317)	472.20 (311.20)	156.30** (74.71)
... after a recent employment gain	.0385 (.0256)	687.83* (411.53)	166.93** (74.27)	.0056 (.0295)	-757.34** (323.04)	-155.80** (75.27)
... and continuing being not employed for over a year	-.0149 (.0217)	-555.47* (333.22)	-115.20** (57.07)	-.0277 (.0280)	642.69** (250.76)	107.97* (56.05)
Everyone in the family becomes insured	.0132 (.0191)	386.77 (541.15)	83.70 (95.34)	-.0042 (.0287)	255.96 (220.15)	50.25 (47.85)

Notes: * Significant at 10% level; ** Significant at 5% level; *** Significant at 10%;

Average marginal effects were calculated based on regression models presented in Appendix Tables A2;

Table 7: Expected Average Marginal Effects of Economic Shocks on Paternal Mental Health Spending Among Two-Parent Families.

	Mother			Father		
	Probability of any spending	Conditional spending	Expected spending	Probability of any spending	Conditional spending	Expected spending
Income loss						
...low income family becomes poor or near poor family	.0299 (.0185)	603.66 (390.88)	129.61** (58.36)	-.0076 (.0111)	610.46** (282.72)	38.05 (23.61)
...middle income family becomes low income family	-.0039 (.0140)	-686.75** (343.32)	-107.74** (52.40)	.0103 (.0090)	-84.31 (238.92)	4.06 (17.89)
... high income family becomes middle income	-.0009 (.0124)	11.84 (245.99)	0.57 (36.61)	.0055 (.0068)	-289.64 (196.61)	-16.15 (15.46)
Gaining employment...						
...after a not being employed for over a year	-.0284** (.0115)	-119.88 (323.88)	-55.44 (47.64)	-.0185** (.0081)	-5.85 (209.01)	-19.04 (16.16)
... in year 1 and continuing to be employed for over the entire two year period	-.0316 (.0298)	-106.81 (351.05)	-57.72 (56.68)	.0241 (.0155)	-412.20 (367.47)	-6.61 (26.00)
Losing employment...						
... after being employed for over a year	.0588* (.0313)	-424.29 (463.31)	14.38 (66.01)	-.0158 (.0158)	501.26 (369.90)	21.61 (28.33)
... after a recent employment gain	.0272* (.0160)	-531.10 (337.49)	-43.34 (49.64)	.0083 (.0115)	89.06 (285.85)	15.00 (23.28)
... and continuing being not employed for over a year	.0012 (.0121)	650.99** (285.28)	98.79** (42.70)	.0102 (.0096)	-83.20 (217.20)	4.05 (16.98)
Everyone in the family becomes insured	-.0044 (.0154)	1075.52** (419.12)	154.79** (64.34)	.0012 (.0087)	84.72 (175.41)	7.58 (12.76)

Notes: * Significant at 10% level; ** Significant at 5% level; *** Significant at 10%;

Average marginal effects were calculated based on regression models presented in Appendix Tables A3;

APPENDIX

Table A1: Total Family Mental Health Spending and Economic Shocks: Regression Analysis

	Two-parent families				Single-mother families			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Probit								
Income								
poor or near poor: <125% poverty line	.0400 (.0773)	.0063 (.0829)	.0104 (.0839)	-.0004 (.0848)	.1115 (.1457)	.0452 (.1432)	.0549 (.1449)	.0603 (.1441)
low income: [125; 200)% poverty line	.0129 (.0642)	-.0079 (.0689)	-.0044 (.0689)	-.0073 (.0698)	.0548 (.1342)	.0017 (.1359)	.0114 (.1372)	.0131 (.1361)
middle income:[200; 400)% poverty line	-.0164 (.0468)	-.0268 (.0500)	-.0252 (.0499)	-.0266 (.0504)	.0488 (.1185)	.0105 (.1217)	.0188 (.1217)	.0205 (.1203)
Employment: Any parent...								
... employed all year long	-.1169 (.0988)	-.1309 (.1124)	-.1386 (.1171)	-.1481 (.1206)	-.0332 (.1488)	-.0417 (.1616)	-.0450 (.1601)	-.0394 (.1616)
... gained employment during a year	-.1451 (.0493)***	-.1604 (.0544)***	-.1619 (.0551)***	-.1644 (.0554)***	-.0566 (.0950)	-.0615 (.1027)	-.0603 (.1028)	-.0582 (.1035)
... lost employment during a year	.0108 (.0510)	.0117 (.0545)	.0117 (.0552)	.0101 (.0562)	.0235 (.0999)	.0241 (.1084)	.0222 (.1080)	.0291 (.1103)
Health insurance								
everyone in the family IS insured ALL year long	.0572 (.0630)	.0570 (.0681)	.0563 (.0691)	.0555 (.0695)	.0231 (.0881)	.0261 (.0944)	.0279 (.0941)	.0334 (.0941)
GLM								
Income								
poor or near poor: <125% poverty line	-.1443 (.2298)	-.1422 (.2255)	-.0773 (.2122)	-.1092 (.2141)	-.0159 (.2439)	-.0510 (.2259)	.1017 (.2454)	.0537 (.2355)
low income: [125; 200)% poverty line	-.1284 (.1999)	-.2830 (.2047)	-.2757 (.1989)	-.3036 (.2047)	-.0486 (.2215)	-.0501 (.2185)	.0817 (.2302)	.0337 (.2250)
middle income:[200; 400)% poverty line	.2564	.2038	.1843	.1969	-.1693	-.1864	-.0866	-.1034

	(.1457)*	(.1573)	(.1566)	(.1640)	(.1830)	(.1773)	(.1817)	(.1787)
Employment: Any parent...								
... employed all year long	-.1479 (.2829)	-.1409 (.2643)	-.1901 (.2428)	-.2158 (.2391)	-.1937 (.2423)	-.1643 (.2467)	-.1222 (.2566)	-.1927 (.2488)
... gained employment during a year	-.1108 (.1352)	-.0888 (.1552)	-.1043 (.1496)	-.0954 (.1522)	.2724 (.2113)	.2429 (.2107)	.2512 (.2115)	.2163 (.2077)
... lost employment during a year	-.3358 (.1401)**	-.2857 (.1391)**	-.2083 (.1252)*	-.2333 (.1263)*	-.0286 (.1519)	-.0240 (.1546)	-.0322 (.1580)	-.0713 (.1505)
Health insurance everyone in the family IS insured ALL year long	.1283 (.1853)	.1918 (.2112)	.1508 (.1974)	.1630 (.2003)	.1125 (.1356)	.1109 (.1457)	.1750 (.1459)	.1609 (.1454)
Baseline mental health								
Number of family members with mental health issues								
At least one family member		X				X		
More than one family member		X				X		
Who has any mental health issues								
Mother			X				X	
Father			X				X	
At least one child			X				X	
More than one child			X				X	
What kind of mental health issues family faces								
Significant behavioral impairments among children				X				X
Severe psychological distress				X				X
Depression symptoms				X				X
Fair or poor self-reported mental health				X				X

Note:

- a) Standard errors in parentheses
- b) * Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level
- c) Other regressors include maternal race and ethnicity (Black non-Hispanic, white non-Hispanic (reference category), other race non-Hispanic, Hispanic), maternal educational attainment (less than high school, high school diploma or GED (reference category), some college, and college degree), mother's age at the year one of the panel, age of the youngest child at the first year of the panel, number of children in the family, region of residence (Midwest, Northeast, West, South (reference category)). Regressions also include year dummies and within family time averages of income, employment, and health insurance variables for Mundlak CRE estimation procedure.

Table A2: Economic Shocks and Spending on Mental Health Related Prescription Medications and Mental Health Ambulatory Care

	Two-parent families		Single-mother families	
	Total family mental health spending toward...			
	prescription medications	ambulatory services	prescription medications	ambulatory services
Probit				
Income				
poor or near poor: <125% poverty line	.0800 (.0848)	.0784 (.0908)	.1891 (.1537)	.1201 (.1591)
low income: [125; 200)% poverty line	.0263 (.0713)	-.0064 (.0948)	.1500 (.1330)	.2059 (.1566)
middle income:[200; 400)% poverty line	-.0015 (.0461)	.0479 (.0552)	.0719 (.1186)	.1426 (.1465)
Employment: Any parent...				
... employed all year long	-.1865 (.1007)*	-.1347 (.1257)	-.0496 (.1513)	-.0918 (.1453)
... gained employment during a year	-.1595 (.0426)***	-.0947 (.0665)	-.0714 (.0951)	.0818 (.1110)
... lost employment during a year	-.0319 (.0483)	.0595 (.0871)	-.0321 (.0970)	.1026 (.1033)
Health insurance everyone in the family IS insured ALL year long	.0444 (.0468)	.0530 (.0765)	.1204 (.0807)	-.0154 (.1061)
GLM				
Income				
poor or near poor: <125% poverty line	-.0845 (.1769)	-.2326 (.5877)	.1083 (.2470)	-.8430 (.3328)**
low income: [125; 200)% poverty line	-.2010 (.1596)	-.0594 (.5328)	.0374 (.2458)	-.7309 (.2872)**
middle income:[200; 400)% poverty line	-.1555 (.1419)	-.1261 (.2475)	-.0221 (.2062)	-1.0022 (.2315)***
Employment: Any parent...				
... employed all year long	-.0593 (.1698)	-.0439 (.6341)	.1596 (.2461)	-.9969 (.3729)***
... gained employment during a year	.1084 (.1072)	-.1091 (.2056)	.1507 (.2223)	.1025 (.2349)
... lost employment during a year	-.1193 (.1482)	.4577 (.2491)*	.0416 (.1564)	-.5747 (.2163)***
Health insurance everyone in the family IS insured ALL year long	-.0521 (.1194)	.3187 (.4398)	.0643 (.1401)	.2289 (.1951)

See Appendix Table A1 notes

Appendix Table A3: Economic Shocks and Mental Health Spending for Parents and Children

	Two-parent families			Single-mother families	
	Mother	Father	Children	Mother	Children
Probit					
Income					
poor or near poor: <125% poverty line	.1123 (.1003)	.0602 (.1063)	.0310 (.0880)	.1689 (.1712)	.0820 (.1551)
low income: [125; 200)% poverty line	-.0217 (.0785)	.1159 (.0733)	.0579 (.0750)	.1107 (.1598)	.0435 (.1476)
middle income:[200; 400)% poverty line	-.0041 (.0556)	.0403 (.0495)	.0490 (.0531)	-.0649 (.1416)	.0774 (.1178)
Employment: Any parent					
employed all year long	-.2692 (.1369)**	.0411 (.1248)	-.1425 (.1273)	-.0031 (.1602)	-.1609 (.1459)
gained employment during a year	-.1274 (.0517)**	-.1356 (.0595)**	-.0504 (.0609)	-.0522 (.0966)	-.1280 (.1063)
lost employment during a year	-.0054 (.0542)	-.0749 (.0702)	.0942 (.0595)	.0817 (.1113)	-.1013 (.1062)
Health insurance					
everyone in the family IS insured ALL year long	-.0197 (.0689)	.0091 (.0640)	.0682 (.0853)	.0076 (.0990)	.0231 (.0773)
GLM					
Income					
poor or near poor: <125% poverty line	-.0537 (.2795)	.2291 (.2995)	.1183 (.2770)	-.1967 (.2904)	-.0124 (.3392)
low income: [125; 200)% poverty line	-.5084 (.2580)**	-.3622 (.2619)	.1764 (.2794)	.1562 (.3002)	-.2941 (.3119)
middle income:[200; 400)% poverty line	.0089 (.1854)	-.2805 (.1866)	-.1241 (.2128)	.0006 (.2743)	-.1757 (.2709)
Employment: Any parent...					
employed all year long	-.1708 (.3589)	-.4049 (.3870)	.2812 (.3450)	-.0681 (.2705)	.1514 (.3653)
gained employment during a year	-.0903 (.2420)	-.0057 (.2024)	.0287 (.1652)	.3632 (.2297)	.3320 (.3166)
lost employment during a year	-.4904 (.1890)***	.0806 (.2099)	-.0720 (.2352)	.1067 (.1998)	-.0472 (.2196)
Health insurance					
everyone in the family IS insured ALL year long	.8102 (.2712)***	.0821 (.1699)	-.5646 (.4553)	.1134 (.1540)	.1370 (.1853)

See Appendix Table A1 notes