Racial/Ethnic Differences in Children's Mental Health:

the Role of Economic Downturns

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Abstract

Visits for emergency psychiatric care reportedly gauge the incidence of population-level mental disorder. Non-Hispanic black children— more than any other race/ethnicity— rely on emergency psychiatric care. One hypothesized cause of this overrepresentation involves their sensitivity to economic downturns. We test this hypothesis by examining whether the black/white difference in psychiatric emergency visits increases in months when the regional economy contracts. We applied time-series methods to California Medicaid mental health data for youth aged 5 to 21 years, from 1999 to 2008. Methods control for spurious associations due to trend, seasonality, and other temporal patterns in visits among Medicaid youth. We find that, one month following mass layoffs, black youths use more emergency mental health services than do non-Hispanic whites. Further analysis of routine (i.e., non-urgent) mental health visits indicates that the mass layoff / emergency visits relation among blacks does not arise from a general increase in help-seeking due to cost-shifting of private to public health insurance. Economic downturns may exert a “ripple effect” by provoking or uncovering mental disorder among youth who by and large do not participate in the labor force. This relation, moreover, may concentrate among non-Hispanic blacks.

Introduction

Non-Hispanic black children— more than any other race/ethnicity— rely on emergency psychiatric services for mental health care (Snowden, Masland, Libby, Wallace, & Fawley, 2008a). Care in the crisis setting undermines high-quality treatment, limits opportunity for ongoing patient monitoring, and results in sub-optimal mental health outcomes relative to non-urgent care admissions (Institute of Medicine, 2006; Korn, 2000). The racial disparity in children's psychiatric emergency care has garnered attention from the U.S. Surgeon General, the Institute of Medicine, and the President's New Freedom Commission on Mental Health (Hogan, 2003). One of the proposed causes of the overrepresentation of black youths in emergency services involves the dynamic economic environment. Research on economic downturns shows particularly adverse effects on black families (Ennis, Hobfoll, & Shroder, 2000). The National Research Council describes the problem as follows:

> "Blacks are acutely sensitive to the expansions and recessions of business cycles. Blacks are disproportionately employed in low-wage jobs, unprotected by tenure and seniority, and in manufacturing and other goods-producing industries that are particularly sensitive to the business cycle" (Jaynes & Williams, 1989).

Heightened sensitivity to economic downturns may increase socioeconomic disadvantage, further strain families, and elevate the incidence of stressful life

events (Catalano, Snowden, Shumway M, & Kessell, 2007). These circumstances, which may trigger aggression, suicidal thoughts, or oppositional conduct, could result in disproportionately high psychiatric emergency visits among blacks. The elevated incidence of crisis visits among non-Hispanic blacks not only represents a failure of the system of mental health care for youth but also imposes a substantial economic burden on the health care system and society at large (Schneider, 2003).

Literature on crisis mental health care visits following economic downturns typically focuses on adults that participate in the labor force (Catalano, Rook, & Dooley, 1986; Goldman-Mellor, Saxton, & Catalano, 2010; Montgomery, Cook, Bartley, & Wadsworth, 1999; Prause, Dooley, & Huh, 2009). This focus arose since research linking economic downturns to increased mental health visits invokes hypotheses pertaining to the recently dis-employed or those who fear unemployment. Less is known, however, about the "ripple effect" of economic downturns on utilization among youths, of which a small fraction participate in the labor force (Bruckner, Snowden, Subbaraman, & Brown, 2010).

Regional economic downturns may disproportionately affect black youths in three ways. First, parental mental illness is a well established risk factor for child and adolescent mental illness. Undesirable financial and non-financial events that follow unexpected unemployment may "provoke" mental illness in parents and, in turn, new disorder in their children and adolescents that, absent the additional stressor, would have remained sub-clinical (Catalano et al., 1986). Second, in line with studies indicating that parental and family stress varies positively with child and youth mental health treatment seeking, families with children who suffer chronic disorder

but who are not in treatment during stable economic conditions may seek services when a family member becomes unemployed (Verhulst & Van der Ende, 1997). Third, un- or under- employment in the community may stress parents or other family members who remain working. In longitudinal studies, high levels of mass layoffs reportedly increase job insecurity, strain employee relationships, and increase fear, anxiety and depression among remaining workers (Catalano, Goldman-Mellor, Saxton, Margerison-Zilko, & Anderson, 2011; Goldman-Mellor et al., 2010). This fear and anxiety may be quite prevalent because, during economic downturns, employed persons who fear job loss far outnumber those who actually lose their jobs (Dua & Smyth, 1993; Karr, 1992). Elevated anxiety and fear among parents and family members may lead to stress transmission to children that may further provoke aggression, suicidal ideation, or other disorders.

Families that seek mental health care for their children may turn to the publicly funded children's Medicaid Early Periodic Screening, Diagnosis, and Treatment (EPSDT) program. After settlement of a lawsuit in 1995, California's EPSDT liberalized medical-necessity criteria, provided for mental health screening, and mandated the State to pay for treatment provided by non-psychiatrist providers (Bruckner et al., 2010; Snowden, Masland, Fawley, Wallace, & Cuellar, 2008b). In California, many employed persons and their children qualify for Medicaid and EPSDT services. No Medicaid rule precludes low-income, working families. A substantial fraction of single parents with children—the single largest group of Medicaid recipients—are employed. (Perreira, 2006) In addition, over 10 percent of all employed persons in California report Medicaid eligibility (California Health

Interview Survey [CHIS] 2005). Based on these data, low-income, employed families who lose jobs can use Medicaid services for their children both before and after unemployment occurs. This group could respond to economic downturns in ways, described above, that increase Medicaid-financed EPSDT services for youth.

Consistent with the notion that blacks may appear especially sensitive to economic downturns, we test the "economic strain" hypothesis by that the black/white difference in children's psychiatric emergency visits increases in months when the economy contracts. We perform our test in California, the most populous of the United States, and focus on the low-income population of youths that use Medicaid-financed mental health services. If results support the hypothesis, we then explore whether Hispanic youths—another ethnic minority that has relatively fewer financial and structural resources—also appear more sensitive than do non-Hispanic whites to economic downturns.

Methods

Variables and Data: EPSDT provides integrated care covering a wide range of screening, diagnostic, and treatment services for Medicaid beneficiaries. The EPSDT mental health program serves about 130,000 children (aged 5 to 21 years) per month and currently costs the State of California over $1 billion annually. We defined our dependent variable as the monthly count of unplanned crisis visits among non-Hispanic black youths in EPSDT. Unplanned visits include two of the 13 services offered by EPSDT: crisis intervention and crisis stabilization (California Department of Mental Health 2012; Institute of Medicine, 2006). California Code of

Regulations, title 9, chapter 11, defines unplanned crisis services as care lasting less than 24 hours, to or on behalf of a child, for a condition that requires more timely response than regularly scheduled visits. For brevity, we refer to unplanned crisis services as emergency services. The State of California Department of Mental Health provided us with data for 106 months beginning July 1999 and ending April 2008. This span represents the longest data series available to us at the time of the tests. Our study used de-identified, aggregate level data; therefore, the study was exempt from Human Subjects Review.

We used as the independent variable the monthly initial unemployment insurance claims induced by mass layoff events in California. The Bureau of Labor Statistics counts monthly mass layoffs when establishments have at least 50 initial claims for unemployment insurance filed against them during a five week period (http://www.bls.gov/MLS/). Mass layoffs, more than individual unemployment, occur due to macroeconomic circumstances exogenous to the performance or mental health functioning of individuals. For this reason, researchers in mental health epidemiology frequently use mass layoffs (rather than, for example, the unemployment rate) to minimize the concern of reverse causality (Goldman-Mellor et al., 2010). In the field that examines economic contraction and mental health, reverse causality might occur when a preexisting mental disorder increases the likelihood of both becoming unemployed and seeking subsequent mental health services.

Mass layoff-induced unemployment insurance claims measure the population-level magnitude of lost wages, tips, or other forms of compensation.

Increased levels of mass layoffs also predict an increase in both perceived threats to economic security and self reporting of stressful life events (Catalano et al., 1986). These financial and life event responses may elicit the mechanisms described in the Introduction to increase youth emergency mental health admissions, especially among blacks.

Analysis: Our test turns on whether the black-white difference in emergency mental health services among youths rises above statistically expected values months after increases in mass layoffs. We applied autoregressive, integrated, moving average (ARIMA) time-series routines, derived by Box and Jenkins, to perform our test (Box, Jenkins, & Reinsel, 1994). EPSDT emergency visits among non-Hispanic blacks may exhibit trend, seasonality, and other temporal patterns. If these patterns, collectively referred to as autocorrelation, were shared by monthly mass layoffs, spurious associations could arise. To rule out this possibility, we used a data-driven approach that removes autocorrelation in the dependent variable series. Box-Jenkins methods identify and remove both “autoregressive” and “moving average” patterns in series. Application of these routines renders a series in which the expected value of residual emergency visits is zero and the monthly observations are statistically independent of one another.

The race-specific nature of our test allows us to build on the logic above but implement a more rigorous strategy to minimize the threat of unmeasured confounding (Catalano & Serxner, 1987). We used as a control series in the time-series equation the monthly count of EPSDT emergency visits among non-Hispanic white youths. Inclusion of this control variable removes any autocorrelation in

emergency visits induced by forces at work for both black and white youths. This patterning, for example, could arise from predictable "spikes" in psychiatric emergency visits at the beginning of the school year (i.e., the September effect) that relates to all race/ethnicities. Our control strategy, routinely used in the epidemiologic literature (Bruckner, 2008; Nobles, Brown, & Catalano, 2010; Upshur, Knight, & Goel, 1999) minimizes spurious associations that could arise from an unmeasured confounder affecting both groups of children that coincides with mass layoffs. Use of the "control group" series also holds intuitive appeal: the coefficient for mass layoffs now captures the *racial/ethnic-specific difference* in the mental health response to economic downturns.

Consistent with the literature, we specified the mass layoff variable with no lag (i.e., mass layoffs the same month as emergency admissions) as well as in lags of 1 (i.e., mass layoffs in the month before emergency admissions) and 2 months to ensure capturing any delayed associations. Using software from Scientific Computing Associates (Liu & Hudak, 1994), we estimated the following test equation:

$$Y_t = \left(\omega_0 B^0 + \omega_1 B^1 + \omega_2 B^2\right) M_t + \omega_3 EW_t + \frac{\left(1 - \theta B^q\right)}{\left(1 - \phi B^p\right)} a_t$$

Y_t is the count of emergency mental health services among black youths in month t.

M_t is the count of unemployment insurance claims, in 1,000s, due to Mass Layoffs in month t.

B^n is the value of the variable at month t-n.

ω_0 to ω_2 are the estimated parameters for the Mass Layoffs variable, lagged at 0, 1, and 2 months before emergency mental health services.

EW_t is the count of emergency mental health services among white youths in month t.

ω_3 is the estimated parameter for the white emergency services variable.

θ is the moving average parameter.

ϕ is the autoregressive parameter.

B^p and B^q are backshift operators that yield the value of a at year t-p for autoregressive and t-q for moving average patterns respectively.

a_t is the error term at month t.

The analyses proceeded through the following steps. First, we estimated an equation predicting non-Hispanic black emergency visits from white emergency visits. Second, we used Box-Jenkins methods to identify and model autocorrelation in residuals of the equation estimated in Step 1. Third, we added the three mass layoff variables to the equation and estimated the coefficients. Fourth, we inspected the residuals from the full equation to ensure they exhibited no autocorrelation. Fifth, as a robustness check, we performed outlier detection routines to identify and remove outliers in emergency services that may distort estimated parameters (Chang, Tiao, & Chen, 1988).

Results

From July 1999 to April 2008, the mean monthly count of psychiatric emergency visits for black youths was 540.1 (SD=125.3; range: 338—892) and that

of emergency visits for whites was 1025.2 (SD=139.6; range: 730—1,429). The proportion of mental health visits among youths that occurred in the emergency setting was higher among blacks (i.e., 2.5 percent of visits) than any other race/ethnicity. Figure 1 plots emergency visits for blacks over time, which displays trend, breaks, and seasonality. Figure 2 shows the monthly count of emergency services for white youths over time. The absolute number of EPSDT emergency clients is larger among white youths than for black youths, which appears consistent with the approximately two times larger volume of non-elderly white clients that use Medi-Cal (The Kaiser Family Foundation, 2007). Figure 3 plots the monthly number of unemployment insurance claims due to mass layoffs in California (mean = 37,354, SD= 12,427; range: 18,768—71,002).

After inclusion of the control series (i.e., emergency visits among white youth), we discovered a structural break in the dependent variable such that the monthly mean of the series after July 2003 fell below the mean before July 2003. This level shift most likely reflects an administrative change in data collection procedures that began in fiscal year 2003. To adjust for this structural break, we inserted a binary "step" variable coded "0" for all months before July 2003 and "1" for all months thereafter.

Box-Jenkins routines detected no seasonality in the dependent variable. We, however, discovered an autoregressive parameter at lag 1 month which suggests that high (or low) values of black emergency services were "remembered" into the following month with similarly high (or low) values, although in diminishing (i.e., 48 percent) amounts. This autoregressive parameter appears in Table 1. Consistent

with the "economic strain" hypothesis, the mass layoffs coefficient at month 1 is positive (coef. = .87, SE = .30, p<.01; see Table 1). This result indicates that black youths use relatively more emergency psychiatric services than do whites one month after the economy contracts. To give the reader a sense of the magnitude of the effect, we estimate an 8.1 percent increase in the black/white disparity in emergency youth visits that is statistically attributable to a modest one standard deviation increase (i.e., 12,427) in mass layoffs.[1]

We performed outlier detection and correction routines to assess whether outliers in emergency visits inflated standard errors and thereby distorted results. We applied the Chang, Tiao, and Chen (Chang et al., 1988) method which iteratively adds binary variables for each month to find any that, if added to the equation, would have coefficients with *t* values greater than 3.5. The method also adjusts the ARIMA parameters as outliers are added. We detected three outliers. Controlling them did not change the inference from the test; however, the size of the coefficient for mass layoffs at lag 1, as well as the standard errors, became smaller (coef: .79, SE = .26, p<.01).

Discovered support for our hypothesis led us to examine whether relatively more EPSDT emergency admissions among black youths reflects a general tendency for this minority group to increase help-seeking for mental health care when the economy declines. It remains possible, for instance, that ambient economic decline may increase help-seeking for Medicaid-financed care if families lose employer-based private insurance and shift their demand to the less costly

[1] 12.427 layoffs (in thousands) * 0.87 more visits per 1,000 layoffs = 10.81; maximum monthly black/white disparity is 134; 10.81 more visits / 134 = 8.1%.

public sector (Dooley & Catalano, 1984). Such a cost-shifting strategy could increase EPSDT admissions when mass layoffs increase even if no additional disorder were provoked or uncovered among minority populations. To test this possibility, we analyzed whether *routine, non-crisis* EPSDT visits similarly rose more among blacks than whites when mass layoffs increased. For this analysis, we essentially repeated the time-series steps described in the Methods but instead used routine EPSDT visits (routine = total visits – urgent visits) among black youths as the dependent variable (and routine visits for whites as the control series). Interestingly, we discovered that black youths use relatively *fewer* routine EPSDT services than do whites when the economy declines. The coefficients for mass layoffs at all three lags are negative and reach conventional levels of statistical significance (lag 0 coef: -.009, SE = .003; lag 1 coef: -.011, SE = .004; lag 2 coef: -.011, SE = .003; $p<.01$ for all, two-tailed test). This finding indicates that, following economic downturns, whites seek relatively more non-urgent care from EPSDT than do blacks. In light of this finding, it appears unlikely that the black-white disparity in emergency mental health visits arises from a general increase in overall help-seeking among blacks.

Although our hypothesis about overrepresentation of black youths in emergency settings led us to test the mass layoff / emergency care relation among blacks, we explored whether Hispanic youths—another ethnic minority that disproportionately occupies the lower end of the socioeconomic spectrum—may similarly respond to economic downturns. Although Hispanics use relatively fewer emergency services than do non-Hispanic blacks and non-Hispanic whites, the need for emergency mental health care may rise when this population faces further

socioeconomic disadvantage (Snowden et al., 2008a). We repeated our time-series analyses described above but now used emergency services for Hispanic youths as the dependent variable. Outlier-adjusted results show that, relative to non-Hispanic whites, a rise in emergency services among Hispanic youths coincides with an increase in mass layoffs in that same month (coef. = 1.00, SE = .43, p=.02). This finding, however, appears sensitive to outlier control in that we observe a borderline positive relation between layoffs and Hispanic emergency admissions when outliers are not controlled (coef. at lag 0: .74, SE = .48, p=.11).

Discussion

The recent Great Recession reminds us that economy acts as a pervasive and dynamic stressor that affects not only those who lose jobs. It remains unclear, however, whether the mental health of low-income children—especially racial/ethnic minorities—responds adversely to the regional economy. We tested the hypothesis that emergency psychiatric services among low-income, non-Hispanic black youths rises when the economy contracts. Time-series results in California support the hypothesis in that, one month after an increase in mass layoffs, black youths enrolled in Medicaid use more emergency mental health services than do non-Hispanic whites. Population-level findings suggest that, especially among blacks, ambient mass layoffs may either provoke or uncover mental disorder among youths that compel their parents to have them seek emergency care.

Results appear consistent with previous literature in that downturns in the regional economy elicit a “ripple effect” on the mental health of youths who by and

large do not participate in the labor force (Bruckner et al., 2010). Findings also converge with individual-level reports of familial transmission of stress during layoffs as well as increased use of child mental health services following parental stressors (Rook, Dooley, & Catalano, 1991; Verhulst & Van der Ende, 1997). Our study, however, cannot identify specific pathways through which mass layoffs precede heightened representation of black youth in crisis mental health care settings.

Psychiatric epidemiologists have proposed a variety of direct and indirect mechanisms that may connect economic adversity to disorder among black youths (Snowden, Catalano, & Shumway, 2009). Some of these pathways include accumulative stress due to caregiving by parents under economic pressure, avoidance or delay of routine health visits when families face adversity, and uncovering of youth disorder when parents spend more time at home. We anticipate that individual-level, longitudinal examination of non-Hispanic blacks, especially during the recent recession, may identify specific pathways to help-seeking. Such work may also identify different coping strategies across low-income minorities in how they define, and seek care for, mental disorder.

Strengths of our analyses include the exogenous nature of mass layoffs which minimizes the concern of reverse causality (i.e., that sub-clinical disorder in the family causes both unemployment and subsequent disorder). Time-series methods, moreover, preclude the possibility that a “third variable” which induces patterns in emergency services accounts for our findings, because we first removed all autocorrelation in the outcome variable. Use of a control series of emergency visits among white youths further removes confounding due to any factor that affects

children's mental health care equally across both race/ethnicities. In addition, exploratory analysis of routine (i.e., non-urgent) mental health visits indicates that the mass layoff / emergency care relation among blacks does not arise from a general increase in help-seeking due to cost-shifting of private to public health care.

Limitations of our analysis include lack of race-specific monthly data on mass layoffs. The Bureau of Labor and Statistics does not report monthly mass layoffs by race/ethnicity category, which compelled us to use ambient mass layoffs as a gauge of the population-level magnitude of lost wages, tips, and income. To the extent that race-specific layoffs gauge a more acute economic response for ethnic minorities, our effect estimates may be conservative. In addition, we analyze only acute responses to ambient layoffs. We, therefore, caution against using our findings to estimate the long-run population mental health response to sustained economic decline. We, moreover, use emergency mental health visits among youth to gauge variation in mental disorder despite the fact that myriad factors other than the severity of disorder may impede or compel persons to seek care in a Medi-Cal setting (Atdjian & Vega, 2005; Goldman-Mellor et al., 2010). However, we know of no better time-varying, population-based surveillance measure of mental health among youth than what we analyzed. We await the development of such a measure to better estimate incident, severe disorder.

Exploration among Hispanic youths also finds a relatively higher incidence of emergency services (compared to non-Hispanic whites) during months of increased layoffs. Hispanic children, on average, use fewer emergency mental health services than do non-Hispanic whites (Snowden et al., 2008a), but economic declines may

compel this group to seek relatively more crisis care. This finding appears sensitive to outlier control but would warrant further inquiry if confirmed in other places and times.

Elevated emergency mental health visits among black youths following economic decline warrants concern for two reasons. First, emergency mental health services promote neither optimal treatment nor cost-effective use of scarce public resources. Second, the demand for publicly funded emergency services—especially among minorities that may need them the most—could increase precisely when State economies reduce their supply. This circumstance may compel public agencies to devise pro-active strategies that increase preventive and outpatient mental health care among minority populations most affected by economic downturns.

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Figure 1. Non-Hispanic black children. Monthly count of emergency mental health visits among children aged 5 to 21 years and enrolled in California's Medicaid Program, July 1999 to April 2008.

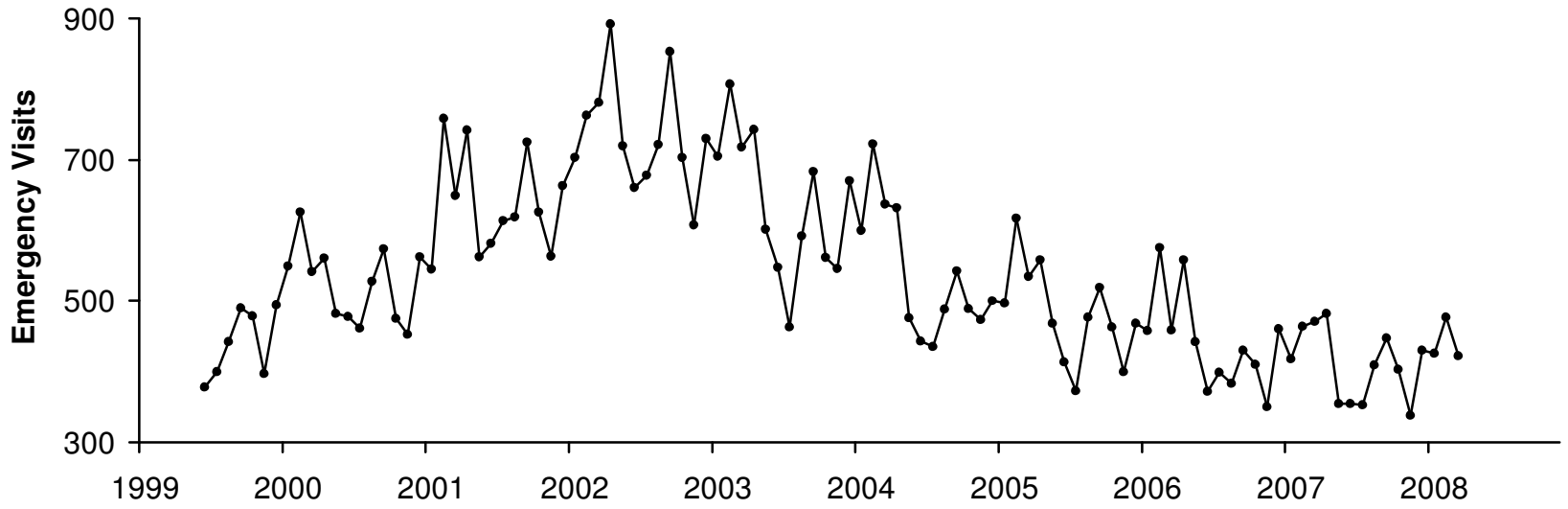

Figure 2. Non-Hispanic white children. Monthly count of emergency mental health visits among children aged 5 to 21 years and enrolled in California's Medicaid Program, July 1999 to April 2008.

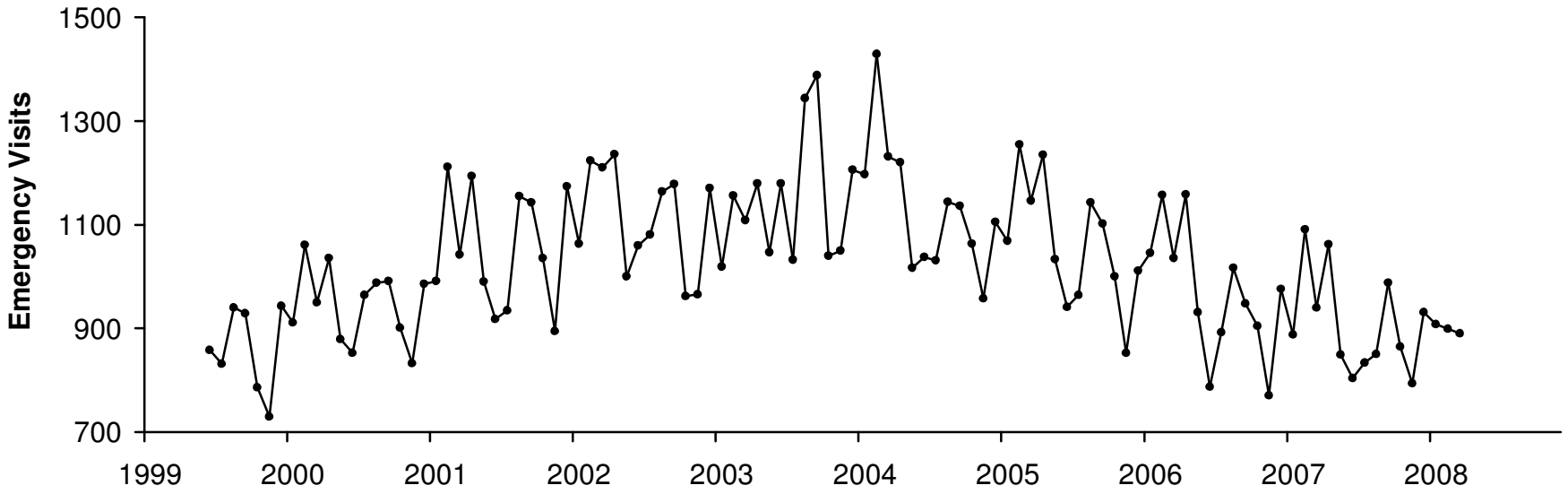

Figure 3. Unemployment Insurance Claims Due to Mass Layoffs in California for 107 months, July 1999 to April 2008.

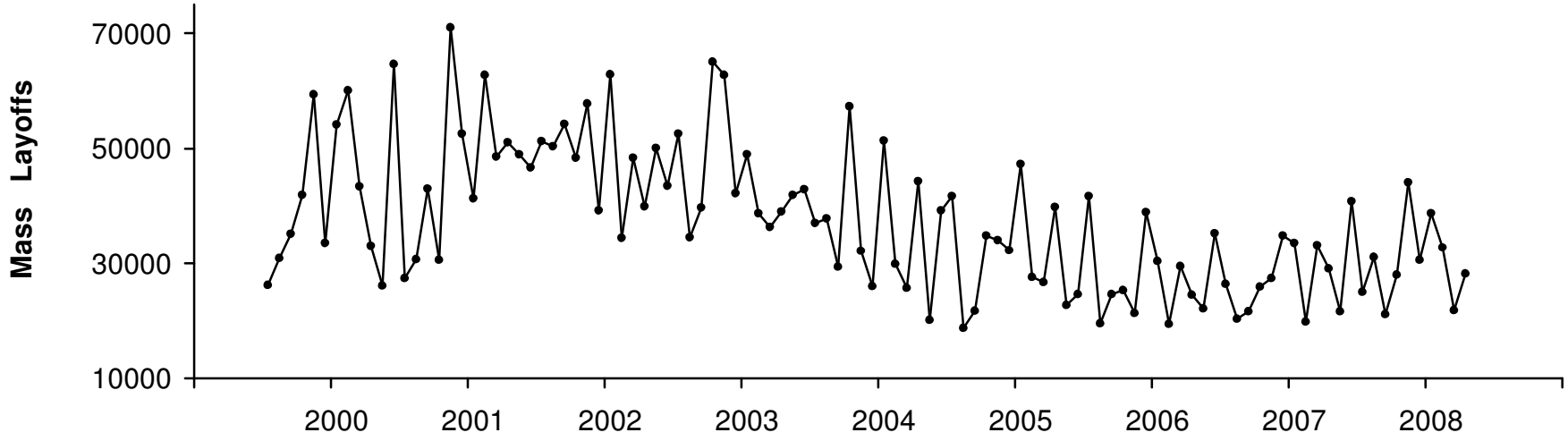

Table 1. Time-series results in California for non-Hispanic black youths in emergency mental health care as a function of white youths in emergency mental health care, state-level mass layoffs, and autocorrelation. Standard errors appear in parentheses.

	Base Model	Outlier-Adjusted Model
Administrative change (starting July 2003)	-135.62 (17.26)***	-125.07 (13.77)***
Differencing	None	None
Non-Hispanic white youths in emergency care	.57 (.028)***	.57 (.023)***
Autoregressive Parameters	B^1 = .54 (.079)***	B^1 = .48 (.084)***
Moving Average Parameters	None	None
Mass Layoffs (in 1,000's) at:		
Same Month of services	.50 (.32)	.25 (.28)
1 Month before services	.87 (.30)**	.79 (.26)**
2 Months before services	-.58 (.35)	-.55 (.30)

*p<.05; 2-sided test; **p<.01; 2-sided test; ***p<.001; 2-sided test