The Great Recession and Mother's Health

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Abstract

We investigate the impacts of the dramatic increases in state unemployment rates that accompanied the Great Recession on the health of women with children using the last two waves of the Fragile Families and Child Well-being Study. We focus on a wide range of physical and mental health outcomes, as well as health behaviors. Our findings from individual fixed effects models suggest heterogeneous impacts across demographic and socioeconomic groups. While a rise in the unemployment rate worsened the physical and mental health, and increased the likelihood of smoking and using drugs for disadvantaged women (minorities, unmarried, and those with low education), the crisis may have actually improved the mental health of more advantaged women (Whites, marrieds, and high education) as well as improving their physical health in some respects: Whites were less likely to be obese and highly educated mothers were less likely to have health problems. High unemployment rates also increased the odds of smoking and drinking for more educated and White women. Our results confirm the importance of controlling for individual fixed effects to identify the causal impact of unemployment as well as the importance of considering heterogeneous impacts across groups.

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The Great Recession in the U.S. was deeper and longer than any previous recession since the 1930s. From peak - December 2007- to trough -June 2009-, output contracted by 4%, the employment rate fell by 6.3%, and the unemployment rate went from 4.8% in April 2008 to 10.6% at its peak in January 2010 (NBER, at ⟨http://www.nber.org/cycles.html⟩). As of June 2013, the unemployment rate was still 2.8 percentage points above what it was at the start of the recession, the labor force participation rate was 63.5%, the lowest rate since 1978, and the percentage of the population with a job, 58.7%, was stuck near levels last seen in the early 1980s (BLS, 2013; Center for Budget Policy and Priorities, 2013).

The start of the Great Recession was severe, sudden, and sharp, and many people experienced some form of financial, psychological, or physical strain. Recent evidence on the effects of the Great Recession has confirmed that losses were disproportionately concentrated among minorities, youth, low income, and less-educated workers (Hoynes, Miller, & Schaller, 2012; Grusky, Western, & Wimer, 2009), and that while men have faced higher unemployment than women, their employment recovery has been faster (Kochhar, 2011).

Since Great Recession represented a huge financial and psychological shock for many households, it may have had a significant impact on health. While a number of studies have examined the relationship between economic downturns and health outcomes, the conclusions are mixed. This study aims to contribute to this discussion by investigating the impacts of the Great Recession on the physical and mental health and health behaviors of women with children. Our study improves on previous research in several ways. First, we are one of the first studies to use longitudinal data to analyze the effects of economic fluctuations on health, and the first to do so for the case of the Great Recession. We employ panel data from the Fragile Families and Child Well-being Study (FF) that allows us to observe the same woman before and during/after

the financial crisis, so we are able to control for individual time-invariant characteristics that might be correlated with both the probability of residing in an area with high unemployment and with experiencing declines in health. Second, by focusing on the Great Recession, we are able to exploit exogenous variation in the unemployment rate across states and years, whereas most existing studies using pre-Great Recession data have examined macroeconomic downturns that exhibit less variation and shorter unemployment durations. Third, we focus on a group of disadvantaged women with children, and this is new in the literature. Most evidence regarding the link between economic fluctuations and health has focused on employed workers (usually men), who have traditionally had the strongest labor force attachment. Hence, little is known about the impacts of the crisis on other groups who have varying degrees of labor force participation but may also be impacted by high unemployment in their communities. Fourth, the FF provides a wide range of health outcomes – including measures of physical and mental health as well as health behaviors. Fifth, by exploiting the city level variation in FF, we also show that using a more local level of unemployment measured at the city level provides very similar estimates to those obtained from using the state level unemployment rate.

Our findings demonstrate the importance of controlling for individual fixed effects when trying to identify the impact of economic fluctuations on health outcomes. Moreover, our results suggest that one reason previous research has found inconsistent impacts of economic fluctuations on health is that the effects are different for different groups.

While we find that the crisis worsened the health of more disadvantaged women -- minorities, unmarried women, and those with low education --, health improved for other groups in some respects. For instance we find that, Blacks and Hispanics, unmarried women, and mothers with a high school degree or less were less likely to have “excellent” or “very good”

health status or to have good mental health, and were more likely to increase health compromising behaviors such as smoking and drug use in response to high unemployment. Whites, married women, and highly educated mothers on the other hand, were likely to have better mental health as well as to experience some improvements in their physical health: Whites were less likely to be obese and highly educated women were less likely to have health problems as unemployment increased. However, whites were also more likely to binge drink and highly educated mothers were more likely to smoke.

We contrast our findings with estimates obtained from replicating our analysis using the Behavioral and Risk Factor Surveillance System (BRFSS), a nationally representative survey that has been widely used in previous studies. The results show very different patterns. We argue that this could be due to the fact that the BRFSS sample of women is a more advantaged group compared to those in FF even when we select a sample of women in BRFSS who are close in terms of observable characteristics to those in FF.

This paper is organized as follows: section II presents a summary of the related literature, section III describes the data, section IV presents the empirical strategy, followed by the results in section V and some extensions in section VI. Section VII provides a brief conclusion.

I. Background

Previous studies of the relationship between economic shocks and their effects on health have come to very different conclusions. A number of studies claim that health improves during economic downturns, arguing that people change their health behaviors (e.g., smoke and drink less, lose weight, exercise more, etc.) in response to changes in the economy (i.e., lower wages, changes in time-use, etc.) (e.g., Ruhm, 2000, 2003, 2005; Ruhm & Black, 2002; Dehejia & Lleras-Muney, 2004). Other studies find that unemployment is associated with poorer health

outcomes, a finding that is attributed to the stress associated with losing a job and/or reductions in income and wealth (Dee, 2001; Sullivan & Wachter, 2009; Eliason & Storrie, 2009a, 200b; Browning & Heinesen, 2012). The lack of consensus on how macroeconomic fluctuations are related to changes in health and health behaviors suggests that additional research is warranted.

Table 1 provides an overview of the previous literature about the effects of unemployment on health. As the table shows, most of the previous work has focused on the U.S. and has employed a reduced-form approach that exploits state and year variation in the unemployment rate to examine changes in health and health behaviors. Previous studies have also concentrated on analyzing health outcomes for working-age individuals with strong labor force attachment, usually men. Thus, little is known about the impacts of unemployment on other demographic groups (e.g., women, children). Existing U.S. studies have mostly employed cross-sectional data, and almost all predate the Great Recession. These studies have often used the Behavioral and Risk Factor Surveillance System, which we will use for comparison with our Fragile Families estimates.

a) How Could the Unemployment Rate Affect Health?

In his pioneering study, Ruhm (2000) linked data on state unemployment rates with state-level Vital Statistics mortality records from 1971 to 1992, to examine the link between economic downturns and mortality. He found that a 1 percentage point increase in the state unemployment rate was associated with a 0.5% reduction in state mortality rates, and he claimed that this result was mainly driven by men of working age.[2] A large number of subsequent studies have investigated the relationship between economic downturns and health. Ruhm (2003), Neumayer (2004), and Gerdtham and Ruhm (2006), using data from the U.S., Germany, and OECD

[2] In particular, he found significant associations for men between 20 and 44, and weak (null) results for those between 45 and 64 and for those over 65.

countries, respectively, confirmed the finding that higher unemployment is associated with lower mortality, and they provided further evidence that individuals are less healthy during economic expansions.[3] Dehejia and Lleras-Muney (2004) also found that infant health, measured by the incidence of low birth weight and congenital malformations, improves in times of high unemployment.[4]

These studies attribute the positive link between economic downturns and health to recession-induced changes in health behaviors. They argue that when the economy deteriorates, unemployment rises and wages go down, leading to both income and substitution effects that may affect health through impacts on the demand for medical care, food, and other goods and services such as cigarettes, alcohol, and physical activity (as predicted by the model of "health production" (Grossman, 1972)).

A recent article by Miller el al., (2011) contradicts Ruhm (2000). The authors suggest that cyclical changes in mortality are concentrated in the young and old, and so are unlikely to represent changes in health behaviors among working age adults. They suggest that the pathway connecting changes in unemployment with changes in mortality has to do with changes in health care quality for individuals 65 and over.

Sullivan and Wachter (2009) followed a large sample of individuals subjected to mass layoffs in Pennsylvania and found significantly higher mortality due to accidents and heart conditions. Eliason and Storrie (2009a), using data from Sweden in 1987 and 1988, examined the effect of plant closings and found a twofold short-term increase in suicides and alcohol-related mortality and a 44% increase in mortality risk among men. Eliason and Storrie (2009b) provided

[3] Ruhm (2003) shows that economic recessions are associated with lower incidence of chronic and acute health conditions such as ischemic heart disease, intervertebral disk disorders, and fewer days spent in bed.
[4] The authors found that Black women are less likely to give birth during recessions (which might be due either to fetal selection or to selection into pregnancy), which tends to raise mean birth weights.

further evidence that job loss significantly increased the risk of hospitalization due to alcohol-related conditions, severe cardiovascular diseases such as myocardial infarction or stroke among men and women, and due to traffic accidents and self-harm among men only. Browning and Heinesen (2012), using Danish administrative data, also found that job loss increases the risk of overall mortality and of death specifically from circulatory disease and traffic accidents.

The disconnect between the literature on the effects of individual job loss and the literature on the effects of unemployment on state-level outcomes suggests that it may be fruitful to investigate the effects of unemployment using individual-level longitudinal data, as we do in this paper.

b) How Could the Unemployment Rate Affect Health-Behaviors?

Studies examining the association between economic fluctuations and health behaviors have generally focused on health-compromising behaviors such as alcohol use and abuse, and cigarette smoking, and have provided mixed evidence. While Ruhm (1995) and Ruhm and Black (2002) found that drinking is pro-cyclical, Ruhm (2000) later found that the association between the state unemployment rate and binge drinking is actually positive, although non-significant and Tekin, McClellan, and Minyard (2013) found a negligible impact. Charles and DeCicca (2008), Xu and Kaestner (2010), Dee (2001), and Deb et al., (2011) provided evidence that drinking increases significantly during recessions[5].

The evidence on smoking is far less abundant, and the results are also uncertain. While a group of studies have found that when the economy contracts, smoking declines (Ruhm, 2000, 2005; Xu & Kaestner, 2010), others claim that smoking is counter-cyclical (Dehejia & Lleras-

[5] While Charles and DeCicca obtained their result from a sample of young men with high socioeconomic status, Deb and authors confirmed this finding on a sample of workers near retirement age.

Muney, 2004),[6] or that there is a differential impact across demographic groups. Charles and DeCicca (2008) found that smoking is counter-cyclical for the 10% of men most vulnerable to unemployment (minority and low educated), whereas for those most likely to be employed, smoking falls in times of high unemployment. For the majority of men, unemployment rates were not associated with smoking.

Studies of the effect of economic fluctuations on obesity –a well-established risk factor for cardiovascular disease, high blood pressure, and diabetes – provide similarly ambiguous findings. While Ruhm (2000, 2005) argues that during recessions body mass index (BMI) declines significantly and is particularly driven by those with severe obesity, Charles and DeCicca (2008) and Deb et al., (2011) found an increase in obesity that seemed to be driven by minority and less educated groups[7].

Another important mechanism through which economic fluctuations can affect people's health, regardless of their employment status, is stress. The fear of losing a job, or the actual job loss, can make people anxious or depressed. Studies have found a strong correlation between individual job loss and clinical and subclinical depression, anxiety, and substance use (Murphy & Athanasou, 1999). Several economic studies argue that as the unemployment rate rises, mental health worsens, and that this is evident in outcomes such as suicides and suicide attempts (Ruhm, 2000; Browning & Heinesen, 2012); anxiety, depression, loss of confidence and self-

[6] Dehejia and Lleras-Muney (2004) found that the positive association between unemployment and smoking is only significant for White mothers (not for Blacks mothers who are positively selected into fertility, particularly in terms of education). When they split the sample by education groups, they found that less educated women with high unemployment see large improvements in health and behavior, whereas health and behavior appear to worsen as education increases.

[7] Charles and DeCicca find this result on men with low employment probabilities and Deb et al., (2011) suggest that this effect might be driven by the youngest, those with low non-housing net worth, higher depressive symptoms, less education, and females.

esteem (Theodossiou, 1997); feelings of sadness, hopelessness, worthlessness, restlessness, and nervousness (Charles & DeCicca, 2008); and substance use (Dee, 2001)[8].

Nevertheless, Tekin, McClellan, and Minyard (2013) find that only better educated individuals experience more mental health problems, and they argue that economic deterioration exacts a larger toll on individuals who have a higher opportunity cost of job loss. Other studies have shown that experiencing unemployment is more strongly associated with mental health problems in men than in women, which could be explained by gender differences in occupation and in family responsibilities. The idea is that the nurturing role of women can act as a buffer. Moreover, differences across marital status show that being married appears to have a protective effect on women. The association between unemployment and mental health problems is larger for single than for married women (Artazcoz et al., 2004).[9]

As far as we know, only two studies have used U.S. longitudinal data to examine the effects of recessions on health.[10] These studies, conducted by Davalos and French (2011) and Davalos, Fang, and French (2012), focused on the period 2001 to 2005 and concluded that an increase in the state unemployment rate led to a decline in physical and mental health, and to a rise in drinking among male and female workers between 18 and 59 years of age. Although the authors showed that controlling for time-invariant individual fixed effects was important to identify the impacts of economic fluctuations on health, the magnitude of the effects they uncovered was small. The small effects may reflect the fact that the 2001 recession was mild and

[8] Turner (1995) finds some evidence that the effect of individual unemployment on depression and self-reported health status need to be considered within the contextual unemployment rate. The author argues that under low unemployment rate, the association between individual job loss and depression is stronger, particularly among those with a college degree. One caveat to this study is that the author links individual unemployment with individual health measures which are subject to the problem of omitted variable bias.

[9] The evidence shown in this study is not causal; the authors employ multivariate analysis to estimate the association between experiencing individual unemployment and mental health problems, and they analyze differences in these associations by groups. The study uses data for Spain.

[10] Other studies using longitudinal data for other countries are Ásgeirsdóttir et al., (2012) and McClure et al., (2013).

of short duration (i.e., from peak to trough -first quarter of 2001 to the fourth quarter of 2001- the unemployment rate only increased from to 4.5% to 5.5%) and was followed by a record-long U.S. economic expansion (Kliesen, 2003), providing very little variation in economic conditions for the identification strategy.

As this summary indicates, the evidence on the relationship between economic fluctuations and health is far from clear. The reliance on largely cross-sectional data and lack of variation in unemployment rates in the few longitudinal studies make the net impact of economic fluctuations on people's health difficult to predict. In this study we aim to add to this debate by providing further evidence on the effect of the sudden and dramatic increase in unemployment caused by the Great Recession, on women's physical and mental health, and on their health-behaviors.

II. Data

To investigate the effects of the Great Recession on mother's health, we employ the Fragile Families and Child Wellbeing Study (FF), a longitudinal study of 4,897 births that occurred in 20 large U.S. cities located in 15 states, between 1998 and 2000. Unmarried couples were oversampled and constitute about three fourths of the data. When weighted, the sample is representative of urban births in cities with populations over 200,000. Mothers and fathers were interviewed in the hospital shortly after the birth of the focal child, and follow-up interviews were conducted when the focal child was approximately 1, 3, 5, and 9 years old (waves 2, 3, 4, and 5 respectively).

The FF data are uniquely suited to looking at the effects of the Great Recession, as the most recent data collection, year 9, occurred between May 2007 and February 2010. We pooled years 5 and 9 (periods 2003-2005 and 2007-2010, respectively), which are the years before and

during/after the Great Recession. Of the almost 5,000 mothers interviewed at baseline, 4,350 were interviewed at year 5, and 3,800 at year 9. We focus on these two waves of data (and exclude years 1 and 3) for two reasons. First, we are interested in examining the impacts of the Great Recession on mother's health. Second, not all health outcomes were available for all waves[11]. After restricting the sample to these two waves and to women with complete information on the outcome variables, our analytic sample includes approximately 3,500 mothers (the N varies by the outcome measured). We investigate possible differential attrition further below.

The outcomes of interest for this study include eight measures of maternal physical and mental health, and health behaviors that were obtained from telephone or in-home interviews, and refer to the last 12 months.[12] The following list describes each of the outcomes we investigate. All measures were constructed as binary indicators that take the value of 1 when the mother reports that she has a given condition and 0 otherwise:

Physical health:

1) *Self-rated health status:* "excellent" or "very good" health status versus "good", "fair", or "poor".
2) *Health problem that limits work:* has a health problem that limits work or study-related activities versus no problem.
3) *Obesity:* mother's BMI is equal to or more than 30 versus BMI less than 30.
4) *Health insurance:* covered by either a private or Medicaid versus no insurance.

Health Behaviors:

5) *Smokes:* smokes cigarettes versus no smoking in the last month.

[11] For example, all the questions related to maternal anxiety were only available at years 1 and 3.
[12] These variables include both commonly used health measures and new outcomes that have not been examined in previous studies, for example the use of drugs or an indicator of being diagnosed with clinical depression.

6) *Binge drinking:* drinks 4 or more glasses of alcohol in one occasion versus less than 4 glasses in 1 occasion or no drinking, in the last year.

7) *Use drugs:* uses one or more drugs (includes illegal drugs, sedatives, tranquilizers, amphetamines, or other) [13] "on your own", versus no drug-use. By "on your own" is meant either without a doctor's prescription, in larger amounts than prescribed, or for a longer period than prescribed.

Mental health:

8) Clinical depression: respondent is assessed as clinically depressed[14] versus not clinically depressed.

Mother Characteristics and Health outcomes

Table 2 presents weighted summary statistics for all the women in the sample, and by race/ethnicity. Descriptive statistics indicate that 62% of the sample report health status that is "excellent" or "very good", 10% have a problem that limits their work or study activities, a third are obese, and only 81% are covered by a health insurance. In terms of health behaviors, 30% of the mothers smoke, 13% drink more than 4 glasses of alcohol on one occasion (binge drink), and 5% report drug use "on their own". Almost 15% of the mothers are assessed as clinically

[13] The complete list includes: illegal drugs (marihuana or hashish; cocaine or crack or free base; LSD or other hallucinogens; heroin), sedatives (including either barbiturates or sleeping pills such as Seconal, Halcion, Methaqualone), tranquilizers or "nerve pills" (e.g., Librium, Valium, Ativan, Meprobamate, Xanax), amphetamines or other stimulants (e.g., methamphetamine, Preludin, Dexedrine, Ritalin, "Speed"), analgesics or other prescription painkillers (note: this does not include normal use of aspirin, Tylenol without codeine, etc., but does include use of Tylenol with codeine and other Rx painkillers like Demerol, Darvon, Percodan, Codeine, Morphine, and Methadone), inhalants (e.g., Amylnitrate, Freon, Nitrous Oxide ("Whippets"), Gasoline, Spray paint).

[14] A respondent is assessed as clinically depressed (we use the FF "liberal" scale) if respondent had feelings of dysphoria (depression) or anhedonia (inability to enjoy what is usually pleasurable) in the past year that lasted for two weeks or more and, if she had symptoms (1.losing interest, 2.feeling tired, 3.change in weight, 4.trouble sleeping, 5.trouble concentrating, 6.feeling worthless, and 7.thinking about death) that lasted at least about half of the day and occurred every day during the two week period. The difference between the liberal and conservative measure of clinically depression is the proportion of the day that respondent feels symptoms (the list of 7 items). The liberal scale considers these symptoms to last "at least about half of the day" (Kessler and Mroczek, 1994, 1997), whereas the conservative scale is "most of the day" (Walters et al., 2002). The conservative scale also includes an additional question (symptom). The liberal scale has been used more often in studies employing the FF panel data.

depressed. Comparable figures from the Center for Disease Control and Prevention (2012) indicate that, 55% of women in the U.S. have "excellent" or "very good" health (Whites 65%, Blacks 48%, and Hispanics 51%), 30% are obese, 84.4% are covered by a health insurance coverage, 17% smoke cigarette, 12% binge drink each month, and among mental health problems, 3.7% of women reported feelings of sadness, 2.4% of hopelessness, 2% of worthlessness, and 6% of "everything is an effort" all or most of the time in the past month.[15] These numbers suggest that FF women have on average better or similar physical health to the average US woman, worse mental health, and higher risk health behaviors[16].

Women's characteristics were all measured at baseline.[17] On average, mothers in FF are 27 at the time of childbirth, a third of the sample is White and a third is Black, 60% have a high school education or less, half are married, more than half are poor or near poor (as shown by an income-to needs ratio that is below 200%), and 50% are employed. The sample is representative of out-of-wedlock births in U.S. urban areas (Reichman et al., 2001).

Differences by race/ethnicity indicate that Whites are more educated, more likely to be married, wealthier, and have a higher probability of being employed than Black or Hispanic mothers. They are also in better physical health (75% have a health status that is excellent or very good and less than a fifth are obese) and they have better mental health than minority mothers. In terms of substance use, Hispanic and Black mothers are less likely to report that they smoke, drink, and use drugs compared to Whites.

In columns 5 and 6 of Table 2, we split the sample by low versus high unemployment rates with the cutoff being 6% (the average unemployment rate for the period and states of

[15] Statistics obtained from the Center for Disease Control and Prevention for year 2011 (http://www.cdc.gov/nchs/data/series/sr_10/sr10_256.pdf).
[16] No information was available on drug use at the national level.
[17] We use baseline city weights for FF.

interest in this study). The most striking difference between mothers living in areas with high unemployment, and other mothers, is that they are less likely to be White and more likely to be immigrant and poor. They are also more likely to suffer from obesity and less likely to have health insurance compared to other mothers. These differences in the raw data point to the importance of controlling for differences in the baseline characteristics of mothers in different areas in order to identify the effects of unemployment on health outcomes.

Economic conditions: State Unemployment rate

We obtained data on the state unemployment rate from the Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS)[18]. We construct an average unemployment rate (UR) over the year since the date of the mother's interview, in order to match our key dependent variable which is a health measure over the previous year. The UR is appended to the data based on a mother's baseline state of residence (the state in which she was initially sampled at child's birth) and her date of interview, for both years 5 and 9. We use the state in which she was initially sampled in order to control for the possibility of endogenous migration in response to changes in unemployment rates. Figure 1 shows the large variation in the unemployment rate in all 15 baseline states included in FF for the period 2000 to 2010, and in particular after 2007 when the Great Recession started.[19]

In addition to the state unemployment rate, we also exploit the city-level geographic variation in FF to conduct a possibly more accurate analysis of the impacts of the Great Recession on women's health. Using the LAUS data, we construct a measure of the average unemployment rate (UR) in the mother's original baseline city (the city in which she was

[18] The state unemployment and employment-to-population ratio are obtained from Table 3 in the files: "Regional and State Employment and Unemployment" (in pdf format) that are available for each year/month from Dec/1993 to Apr/2012. The link to the BLS with these specific files is: http://www.bls.gov/schedule/archives/laus_nr.htm#2004.
[19] Figure 1 only includes information for the periods of interview.

initially sampled) and we append it to the FF data based on her Core Based Statistical Area (CBSA, similar to a Metropolitan Statistical Area) and date of the interview.

Control Variables

In models without maternal fixed effects, we include a number of basic socioeconomic and demographic characteristics of the mother that were measured at baseline. These measures include dummy variables for mother's age (<19, 20-23, 24-27, 28-32, 33+), race/ethnicity (White, Black, Hispanic, and other race/ethnicity), education (less than high school, high school, some college, and college or more), immigrant status, marital/relationship status (married, cohabiting, and single), income (we use four categories of income-to-needs ratio[20]: poor is less than 1; near poor is income between 1 and less than 2; middle income is between 2 and less than 4; and high income is 4 or more), and child's age (in months). In models with maternal fixed effects all of these variables are already controlled since they are time invariant.

III. Methods

We estimate the effect of the UR on mother's health using two logistic models, one that pools data from years 5 and 9 and controls for a rich set of covariates and year and state fixed effects, and a second one that accounts for time-invariant mother fixed effects. The following equation describes the first model:

$$Y_{i,t} = \beta_0 + \beta_1 UR_{i,t} + \beta_2 X_{i,t-1} + \alpha_s + \alpha_t + \varepsilon_{i,t} \qquad (1)$$

where $Y_{i,t}$ denotes mother i's health outcome measured at time t, UR is the average unemployment rate in baseline state s over the last year t from the date of interview, X is a vector of mother characteristics measured at baseline (described above), and α_s and α_t are vectors of dummies for baseline state and year, respectively. The baseline state dummies control for any

[20] The income-to-needs ratio is based on the official U.S. poverty thresholds established by the Census Bureau.

time-invariant state level factors that are correlated with both state economic conditions and women's health. The year dummies will absorb year specific factors that could affect both the economy and mother's health. ε is the disturbance term. All models are clustered at the baseline state level to account for within-state correlation in the observations. The coefficient of interest is β_1.

The second logistic model that controls for mother-specific fixed effects is estimated using equation 2. The only covariate included in this model is α_t, the interview year dummy.

$$Y_{i,t} = \beta_0 + \beta_1 UR_{i,t} + \alpha_t + \varepsilon_{i,t} \qquad (2)$$

This model exploits the longitudinal nature of FF to control for observed and unobserved time-invariant characteristics of the mother, that may be correlated with both residing in a state with high UR and experiencing health problems. For instance, if a mother belongs to a demographic group that is likely to be particularly impacted by unemployment, she may also be more likely to suffer from various health problems.

We estimate separate logistic-fixed effects models by subgroups. We stratify the sample by White, Blacks, and Hispanics; marrieds versus unmarried women; and mothers with a high school degree or less versus those with more than a high school degree. We do these separate analyses because we expect to find heterogeneous impacts across groups, and in particular we hypothesize that the most disadvantaged women (minorities, unmarried, and the least educated) will fare worse during the Great Recession than more advantaged women, because they are less likely to be able to insure themselves against contingencies.

IV. Results

Table 3 presents results from the pooled Logistic and Logistic-fixed effects models of the impacts of state unemployment rate on health and health behaviors. We only report the coefficient of interest, β_1, and when this coefficient is statistically significant at least at the 95 percent level of confidence, we show it in bold type.

The Logistic estimates (equation 1) shown in the first row, with one exception, indicate that health gets worse as unemployment increases, but none of the coefficients are significantly different from zero at the 0.95 level of confidence. Self-reported health status and binge drinking are significant at the 0.90 level. Depression, however, is negatively associated with the unemployment rate. While not shown in the regressions due to space limitations, a few covariates are significantly associated with health outcomes in the pooled logistic models. Women with high levels of education report better health outcomes than those with less than a high school degree. Single and cohabiting women have significantly worse health and health behaviors than those who are married. An increase in the income-to-needs ratio measured at baseline is significantly associated with an increase in health status as well as with an increase in substance use.

The second row of Table 3 shows models that control for individual fixed effects. These estimates are similar in size to those obtained from the Logistic models, but in a number of cases the coefficients become statistically significant. The estimates confirm that as the economy worsens, women's physical health declines and health compromising behaviors increase. A rise of 1 percentage point in the UR leads to a 15% decline in the odds of having "excellent" or "very good" health, a 26% increase in the odds of smoking, and a 40% rise in the odds of using drugs. Results in Table 3 demonstrate the importance of controlling for individual fixed effects in order to identify the impacts of macroeconomic fluctuations on health outcomes. During the recession,

the unemployment rate increased from 5 to 10 percent, the likelihood of experiencing poor physical health increased by nearly 75 percent, and the probability of smoking or using drugs increased by more than 100 percent.

No effects are observed on the probability of having health insurance. This result is consistent with Cawley, Moriya, and Simon (2011), who also find no effect on the probability of health insurance for both the working age population and for the sample of women with children.[21] Table 3 also shows that the unemployment rate had no effect on obesity.[22] Previous studies have found mixed evidence on obesity (Ruhm, 2000, 2005; Charles & DeCicca, 2008), however, these studies have not examined the impacts of the UR on women. Moreover, no effects were observed on the probability of being diagnosed as clinically depressed.[23] Previous research has measured mental health with individual measures of self-rated feelings of sadness, hopelessness, or worthlessness, or with more extreme measures such as suicides. We use a robust indicator– being diagnosed as clinically depressed – which is based on the World Health Organization Composite International Diagnostic Interview Short Form (CIDI-SF). The CIDI-SF uses information about a list of different symptoms and their specific durations, and determines a probable diagnosis of the psychiatric condition known as major depressive episode. The CIDI-SF is commonly used in large-scale community surveys (Aalto-Setälä et al., 2002). The fact that we do not observe an effect on clinical depression for the whole sample should not be seen as inconsistent with previous studies. For instance, a recent paper showed that while the 2008 stock market crash, which lead to huge losses in wealth for many households, caused immediate

[21] During the recession there was a sharp decline in the share of the population with employer- sponsored health insurance due to the massive decline in employment, which could have been offset by a significant rise in Medicare enrollment (Cawley et al., 2011).

[22] In another analysis (not shown here) we estimate the effect of UR on the likelihood of being overweight (BMI>=25) and we find no effect.

[23] In another analysis (not shown here) we also find that a rise in the UR is not associated with changes in the likelihood of being sad or blue for at least two weeks in the past year, which is a less extreme case of mental health condition, providing further evidence that there is little impact of the Recession on the aggregate sample of women.

declines in subjective measures of mental health, it did not increase clinically-validated measures of depressive symptoms or indicators of depression (McInerney, Mellor, & Nicholas, 2013). Moreover, this finding could reflect the fact that the effects of unemployment on mental health are not equally distributed across groups defined by gender, marital status, and education, a hypothesis we pursue further below.

The bottom panel of Table 3 shows estimates of the UR at the city level[24]. Results are highly consistent with those obtained using the state level UR. A 1 percentage point increase in the city unemployment rate is associated with a 12% decrease in the likelihood of having "excellent" or "very good" health status (vs. a 15% decline when we use the state UR), a 30% increase in the odds of smoking (vs. 26%), and a 39% rise in the odds of drug use (vs. 40%). Hence, in what follows we focus on results using the state UR rather than the city UR since these are more comparable to previous studies.

Heterogeneous Effects

Table 3 presents the overall effects of the Great Recession. In what follows we examine differences by race/ethnicity, marital status, and education groups. We present only the Logistic-fixed effects models since these provide the more reliable estimates.

Table 4 shows the effects of the UR for the whole sample of mothers, and by racial/ethnicity groups (White, Black, and Hispanic), by marital status (married and unmarried), and by education levels (mothers with a high school degree or less, and those with more than a high school degree). The estimates reveal significant differences in the effects of UR on women's health across subpopulations. In general more disadvantaged mothers – minorities,

[24] Equation 1 is estimated at the city level: it includes the average UR in the last 12 months since the date of interview and in the baseline city, mother covariates measured at baseline, fixed effects at the baseline city and year, and errors are clustered at the baseline city.

unmarried, and the less educated – were likely to suffer negative health impacts while more advantaged women experienced health improvements in certain dimensions.

Results by race/ethnicity indicate that minorities faced more pronounced declines in their physical and mental health compared to Whites. While Whites experienced a similar (although non-significant) decline in the odds of having "excellent" or "very good" health to that for the whole sample (a 10% reduction), in some respects, their health actually improved. For example, a 1 percentage point increase in the UR led to a 50% decline in the likelihood of being obese among whites and to a 35% decline in the odds of being diagnosed with clinical depression. However, Whites were also 60% more likely to binge drink.

The estimates for Blacks (shown in the third row of Table 4) indicate that the odds of having "excellent" or "very good" health fell by 32% and the odds of using drugs rose by 30%. Hispanics also show a marginal increase in drug use and a significant deterioration in mental health (the odds of being diagnosed with clinical depression increase by 30%). This last result contradicts that found in Tekin et al., (2013), in which the Hispanic populations showed an improvement in mental health when state employment rates fell.

We now examine differences by marital status. We exploit the fact that the Fragile Families dataset oversamples births to unwed parents, and as a result, it is possible to study differences by mother's relationship status (married versus unmarried), which is usually difficult to examine in other surveys. The findings indicate that unmarried mothers were hard hit by the Great Recession whereas it may have actually improved the mental health of married mothers without having any other impacts on their physical health or likelihood of substance use. Logistic-fixed effects estimates show that a rise in the UR was associated with a decrease in the probability of being depressed among married women (a 40% reduction in the odds), whereas

unmarried women were 19% less likely to have "excellent" or "very good" health and were more likely to adopt health compromising behaviors (the odds of smoking rose by a significant 31% and drug use increased by 29%, though the latter result is not significant at the 95% level).

Finally, results by education group indicate that more educated women suffered less during the Great Recession as they were less likely to have problems that limited their work-related activities (the odds fell by 45%) and were less likely to be clinically depressed (a 23% reduction in the odds, although only significant at the 90% level of confidence). This result may reflect the fact that those with better employment prospects (the highly educated) suffer less in terms of mental health problems in the face of economic downturns (Charles & DeCicca, 2008). However, more educated women were also more likely to smoke (experiencing a 66% rise in their odds). Mothers with a high school degree or less on the other hand, faced a significant decline in their physical health as they were more likely to report "good", "fair", or "poor" health status (14%) and more likely to have had problems that limited their work (the odds increased by 36%). In terms of health behaviors, less educated women faced a significant increase in drug use (41%).

Comparing the results shown in Tables 3 and 4 to those in Davalos and French (2011), we find that the effects of the Great Recession are significantly greater than those associated with the 2001 recession. For example, we find that a 1 percentage point increase in the state UR reduced the probability of having "excellent" or "very good" health by 3.9%[25] (the odds ratio of having "excellent" or "very good" health fell to 0.848) while they estimate a 0.9% reduction. The differences are even larger for some subgroups. For example, they find that a 1 percentage

[25] To report our estimates as percentages we re-estimated our regressions using Linear Probability Models and then comparing the coefficients to the outcome mean.

point increase in the state UR reduced the physical health for Blacks by 1.2% whereas we find a 9.5% reduction.

V. Extensions

Other measures of economic fluctuations: Employment-to-Population Ratio

Unemployed workers who grow discouraged in their job search and do not actively participate in the labor market are not officially counted as unemployed. Hence, reductions in the unemployment rate may sometimes overstate improvements in the labor market. Alternatively, the unemployment rate may remain high even as employment is rising if discouraged workers come back to the labor market. Thus, in order to more adequately capture fluctuations in the labor market, we also investigate how the state employment-to-population ratio (ER) has affected women's health. The ER is defined as the number of employed workers as a proportion of the total population aged 18-64 in a given state. We construct an annual average ER measure using employment data from the LAUS that come from the Current Population Survey, and we append it to FF data based on a mother's baseline state of residence and her date of interview (see footnote 18).

Appendix Table 5 shows Logistic-fixed effects estimates of the effects of state employment-to-population ratio on health outcomes. We find consistent but weaker estimates compared to those obtained when using the state unemployment rate. That is, as the economy expands, women's physical health tends to improve and substance use declines. We also find heterogeneous impacts across demographic groups, indicating that the positive effects of economic recovery (an increase in ER) are mostly experienced by minority, unmarried, and less educated mothers as they are more likely to have improvements in their physical and mental health as well as a decrease in the odds of using of drugs.

Migration

Since almost 20% of the sample has migrated since they were first sampled at childbirth, we also examine how economic conditions in a mother's current state of residence, rather than in her original/baseline state, are associated with her health outcomes. While the measure of UR at the current state captures the labor market conditions in the place of residence for both movers and non-movers, it is, however, endogenous. Mothers may choose to migrate from their baseline state due to the UR shock and move to places with better economic conditions (e.g., lower UR), and if those mothers who move are different in observed and unobserved ways to those that stay, this could bias our estimates of the UR on health. For instance, if migrant mothers are healthier than those who stay, then, the effect of the UR in the state of residence on mother's health may potentially overestimate the true relationship.

To examine how economic conditions in the state of residence affect health outcomes, we construct a measure of state average unemployment rate in a mother's current state of residence, and we append it to FF based on her current state and year of interview. So for instance, if a mother who was originally (at baseline) sampled at Florida, decides to move to New York, from year 5 to year 9, then her UR measure at her current state of residence will include the UR in Florida in year 5 and the UR in New York in year 9. Her UR at baseline will report the UR in Florida in both years 5 and 9.

Appendix Table 6 shows Logistic-fixed effects estimates of the effects of state UR in the current state of residence on mother's health. The estimates show substantially similar coefficients to those obtained when using the baseline UR, which suggests that our estimates of UR on health may not be greatly affected by selective migration. We find that a 1 percentage point increase in the current state unemployment rate is associated with a 15 percent decrease in

the likelihood of experiencing "excellent" or "very good" health status (15 percent when we use the baseline/original state UR), and an increase in the probability of smoking and of drug use by 26 percent (22 percent) and 40 percent (36 percent), respectively. Differences by subgroups are also very similar to those shown in Table 4, and confirm our previous finding that more disadvantaged groups of women (minorities, unmarried, and less educated mothers) were more likely to suffer health setbacks during the crisis.

Selective attrition

Another potential source of selection bias in this study is the presence of selective attrition from year 5 to year 9. Selective attrition may bias our estimates of UR on health outcomes if for instance, mothers who are interviewed in year 5 and not in year 9, are missing from the data perhaps due to experiencing material hardship in year 9 (e.g., telephone service disconnected), which could be correlated with an increase in the probability of experiencing poor health.

The attrition rate from year 5 to year 9 of FF is 19%.[26] To analyze whether the effect of UR on the probability of attrition was different for different groups, we perform a simple test in which we construct a dummy variable equal to one if a mother attrited from year 5 to year 9[27], and we regress this indicator on the UR she experienced in year 5, her observable characteristics interacted by the UR in year 5, and all other covariates as described in equation 1.[28] In the presence of selective attrition, the coefficients on the interaction between the UR and a woman's characteristics should be statistically significant. We also examine selective attrition in terms of

[26] 3,808 mothers were interviewed in year 5 and 3,069 were interviewed in year 9. These numbers differ slightly from those shown in Table 2 because they are conditional on being interviewed in year 5, hence excludes those mothers who were interviewed in year 9 and not in year 5.

[27] The dummy for attrition from year 5 to year 9 takes the value of 1 when the mother was interviewed in year 5 and not in year 9, and zero otherwise.

[28] We include a mother's baseline characteristics, and state and year fixed effects. Errors are clustered at the state level.

health outcomes (physical and mental health and health behaviors) by replicating the previous analysis on selective attrition based on women's observable characteristics, but this time we interact a woman's health outcomes in year 5 with the UR in year 5.

Appendix Tables 7 and 8 show estimates of selective attrition in terms of women's observable characteristics and in terms of women's health outcomes. We find little evidence of selective attrition in terms of mother characteristics. In fact, the only group that is less likely to attrite in year 9 are women with a college degree who faced high UR in year 5. In terms of health status in year 5 we also find little evidence of selective attrition. We do see, however, that women who suffer from obesity in year 5 are significantly more likely to attrite in year 9 after experiencing high unemployment. These findings suggest that selective attrition is not a big issue in our analysis. To the extent that there is selective attrition, women in better health (i.e., more educated, less likely to be obese, and less likely to consume drugs) are more likely to be interviewed in year 9, which may lead to an underestimate of the effect of the UR on women's health.

State UR and individual labor market outcomes

We now ask how the crisis affected the labor market outcomes of women in our sample, in order to explore the mechanisms underlying the estimated effects on health. Appendix Table 9 shows Logistic-fixed effects estimates of the city UR on women's, their current partner's, and on the father's individual unemployment, employment, and number of weeks worked in the last year that were reported in Garfinkel and Pilkauskas (2013). As with health outcomes, differences by subgroups reveal heterogeneous responses. For unmarried Black and Hispanic mothers, unemployment, employment, and weeks worked at the individual level are strongly related to city level unemployment rates, while for married and White mothers, there is no significant

relationship. The strong relationship between unemployment rates and unemployment and health at the individual level for fragile families and ethnic minorities and its absence for the complementary group, suggests that increases in mother's unemployment lead to declines in health. Why the health of white, married, and highly educated mothers improves, however, is not clear.

The Effects of Economic Downturns on Health Outcomes in the BRFSS

Previous studies investigating the effects of economic fluctuations on health have often used the Behavioral Risk Factor Surveillance System[29] (see Table 1) and have found mixed results. As we discuss here, the BRFSS includes a sample of men and women who are more likely to be advantaged in several socioeconomic dimensions compared to FF women (or to other groups that were likely to be hard hit by the Great Recession). Based on the findings we obtain in this paper – that the negative impacts of the crisis were primarily concentrated among disadvantaged women --, we hypothesize that women in the BRFSS would be less likely to suffer health setbacks associated with the unemployment shock. Our findings generally support this hypothesis.

The BRFSS is a nationwide telephone survey conducted every year by the Centers for Disease Control and Prevention's Behavioral Surveillance Branch, to measure behavioral risk factors in the adult population (18 years of age or older). The BRFSS is carried out in all 50 states and consists of core questions and specific modules included by some states but not others. Most information is comparable over time and across states, and when variables are weighted using BRFSS sampling weights, they produce nationally representative figures. Public health

[29] The BRFSS is publicly available at: http://www.cdc.gov/brfss/annual_data/annual_data.htm.

officials use this survey to develop health policies by computing prevalence rates and establishing relationships among variables.

We start by constructing a sample of mothers in BRFSS that is as close as possible to those in FF, for the period of interest – before and during the Great Recession. We select mothers who had a child between 1998 and 2000 and who were living in the center city of a metropolitan statistical area (MSA) in one of the 15 FF baseline states at the moment of interview. Only the most recent years in BRFSS contain some key variables that allow us to identify mothers with these characteristics.[30] The final sample includes 4,921 mothers who were living in the center city of an MSA in one of 13 FF baseline states[31] for the period 2005-2010.

Appendix Table 10 shows descriptive characteristics for BRFSS and FF mothers. Results indicate that the BRFSS women are a more advantaged group than those in FF, as they are more likely to be White, married, and educated. They are also wealthier.[32] Moreover, the cohabiting sample in BRFSS (6%) is very small compared to that in FF (23%). Single mothers in BRFSS are also very different than those in FF since the BRFSS group includes single, divorced, and widowed women. Even among Whites and among Blacks we find striking differences across datasets: these groups are significantly more educated in BRFSS than in FF (this specific result is not shown). In terms of age, mothers in BRFSS are not on average older than those in FF since mother's age in FF is measured at childbirth (1998-2000) and mother's age in BFRSS is measured in the pooled data (2005-2010), hence age is approximately similar in both cases.

[30] The key questions that BRFFS asks mothers are: the year of birth of the child and whether the mother lives in the city center of an MSA– these are all important variables for this study as the FF is a national study that follows a cohort of urban children born between 1998 and 2000 --.

[31] While FF samples mothers in 15 states, Tennessee and Massachusetts were dropped from the BRFSS sample for not providing sufficient (none) observations on the sample of interest.

[32] Even Whites in BFRSS are more educated, more likely to be employed, and less likely to be married/cohabitate than Whites in FF. Also, Blacks in BFRSS are significantly more educated, wealthier, more likely to be employed, and less likely to cohabitate (more likely to be married and single) compared to those in FF.

We focus on seven measures of self-reported maternal physical and mental health, and health behaviors. We tried to use health measures in BRFSS that could be easily compared to those in FF. One difference across datasets is that the health variables were measured over distinct periods of time. In FF, all health questions refer to the last 12 months whereas in BRFSS they were asked as: "Have you ever…?", making no reference to a specific period[33]. Appendix Table 11 shows the exact questions that were asked to both FF and BRFSS mothers. In general we find that while BRFSS mothers have a self-reported lower health status, they are less likely to be obese, and less likely to smoke and drink. In terms of mental health problems[34], BRFSS women are less likely to suffer from them than FF women.

Appendix Table 12 shows estimates of the UR on health outcomes using BRFSS. Next to these estimates we include the coefficients obtained from Logistic-individual fixed effects models using FF (the same coefficients shown in Table 4), to compare findings across datasets. In general, these findings support our hypotheses: the BRFSS results indicate little or no effect of the UR on women's physical and mental health outcomes. Results by demographic groups also show very weak impacts of the UR[35].

Perhaps the most contradictory result between BRFSS and FF is on health behaviors. While in BRFSS women are significantly less likely to smoke (Blacks reduce smoking by 20% and unmarrieds by 14%) and to drink (the odds of binge drinking fall by 6% for all women) when the UR rises, in FF we find that smoking and drinking rise (smoking increases by 26% for all women and Whites and Hispanics increase binge drinking by 60% and 10% respectively).

[33] Only the question related to maternal depression makes reference to the last month: "(Mother) feels stress or depression for 1 day or more in the last month?".
[34] It is difficult to compare the mental health conditions of women across datasets since these are measured using different variables (see Appendix Table 11).
[35] We also estimate equivalent models using employment-to-population ratio (instead of the unemployment rate). We find that modeling changes in the economy with the ER did not substantively change our results. These analyses are not reported here but are available from the authors upon request.

These contrasting results suggest that health behaviors may be quite different in different samples of women. We do find a significant and consistent impact on obesity for Hispanics across surveys: in BRFSS the odds of being obese rise by 9% whereas in FF they increase by 6%. Of course another limitation of the BRFSS is that it is cross-sectional, so it is not possible to follow the same woman across time in order to control for fixed characteristics of individuals.

V. Discussion and Conclusions

This study contributes to the ongoing discussion of the relationship between economic fluctuations and people's health, by providing new evidence of the effects of the Great Recession on the health of women with children. We show that if we estimate models of the state UR on health outcomes without controlling for individual fixed effects we find small or weak impacts on many outcomes. In contrast, our individual fixed effects specification suggests that economic conditions have significant effects on the health of women. Our results imply that the increase in unemployment from 5 to 10% over the two year period 2007-2009, reduced the odds of having "excellent" or "very good" health status by 75% for all women and increased the odds of smoking and of using drugs.

Previous studies have come to very different conclusions about the impacts of economic downturns on health. Most of this research, however, predates the Great Recession, and only a few studies have focused on the recent crisis. One reason that previous research finds mixed results may be the use of different samples. We show that while the crisis negatively affected the health of those groups of women who were most likely to be impacted by high unemployment, it had weaker effects on other groups.

We find heterogeneous impacts of the UR on women's health. While the recession worsened physical and mental health, and increased smoking and drug use among minorities,

unmarried mothers, and less educated mothers, more advantaged women may have actually experienced better mental health and some improvements in their physical health. For example, we found that Whites were less likely to be obese and more educated women were less likely to have health problems during the Recession. However, the picture was mixed as they were also more likely to smoke and binge drink as the UR increased. These results are consistent with recent findings suggesting that the employment effects of the crisis were disproportionately concentrated in some subpopulations. In particular, men, Black and Hispanic workers, youth, and those with less education were hardest hit during the Great Recession.

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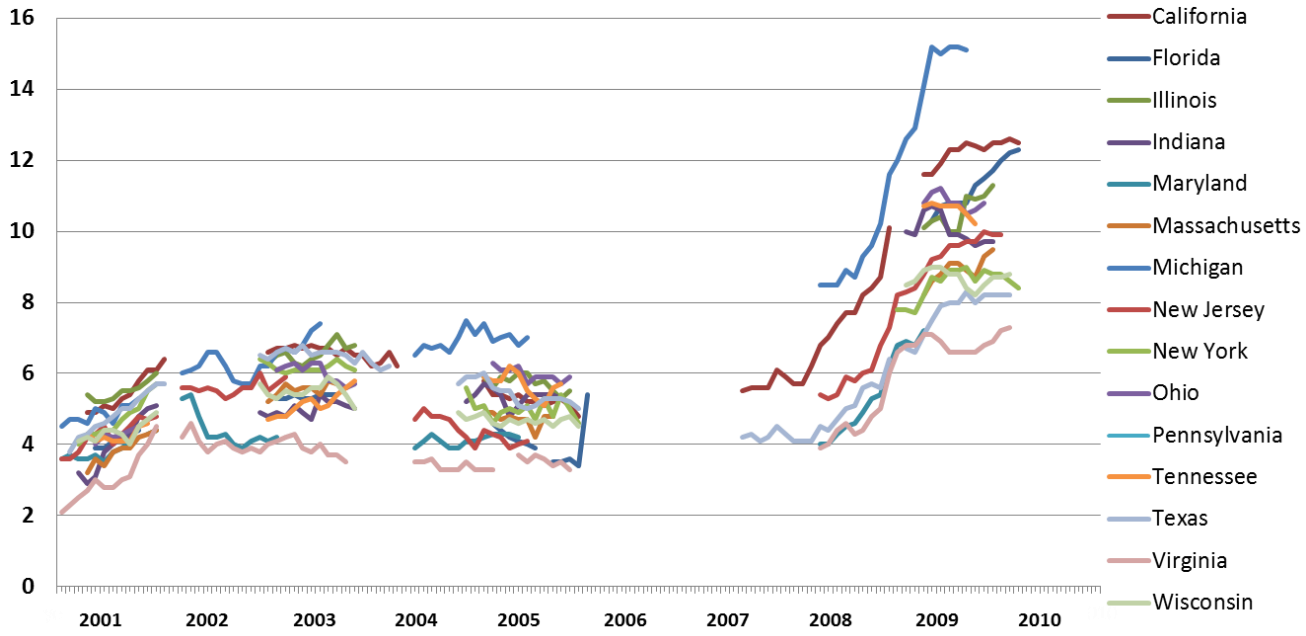
Figure 1: State Unemployment Rate (%) During Interview



Note: sample includes the 15 baseline states in FF.

Table 1 – Effects of UR on Health Outcomes

OUTCOME VARIABLE

Study and Data	**Health status/ Health problem that limits work**	**Weight**	**Use of medical care / Health insurance**	**Smokes**	**Drinks**	**Mental health**
1. Studies Examining Men and Women						
Ruhm (2000) **Micro Data:** - BRFSS: 1987–1995 N =114,000 men and women **Methods:** Linear model		**A 1 pp rise in the UR reduces:** - Underweight by 0.06pp - Overweight by 0.17pp - Obesity by 0.21pp No analysis **by gender**	**A 1 pp rise in the UR reduces:** - Visits to the doctor by 0.57pp No analysis **by gender**	**A 1 pp rise in the UR:** - Reduces smoking by 0.3pp - Reduces # of cigs per day by 0.8pp for current smokers No analysis **by gender**	**A 1 pp rise in the UR:** - Increases alcohol consumption but is NON-significant No analysis **by gender**	
Ruhm and Black (2002) **Micro Data:** **-** BRFSS: 1987-1999 - N = 500,000 men and women **Methods:** Linear model					**A 1 pp rise in UR:** **-** Reduces predicted drinking by 0.2pp - Reduces log(# of drinks) in last-month by 3.1pp for drinkers - No effect on binge drinking **By gender:** - No difference in the probability of drinking - Higher decline for men: # of drinks falls by 3.4pp versus 2.8pp for females	

Study and Data	Health status/ Health problem that limits work	Weight	Use of medical care / Health insurance	Smokes	Drinks	Mental health
Ruhm (2003) **Micro Data:** - NHIS: 1972–1981 for individuals 30+ 3 samples: 1) Full sample: N =217,471 men and women 2) 30–64-year-old workers: N = 115,463 obs, men and women 3) 30–55-year-old working males: N = 57,633 **Methods:** Linear model	**A 1pp fall in the UR:** -For everyone: increases the probability of having a medical condition (chronic or acute) by 0.6 pp -Stronger effects for men of working age **By gender:** - For men 30-55: increases by 0.63pp -For women 30-55: increases by 0.59pp		**Hospital visit is NON-significant in all cases** **A 1pp fall in the UR:** -For everyone: the probability of hospitalization falls by 0.11pp and doctor visits rises by 0.3 although NON-significant -Stronger effects for men of working age **By gender** results were non-significant: - For men 30-55: falls by 0.11pp -For women 30-55: falls by 0.13pp			
Ruhm (2005) **Micro Data:** - BRFSS: sample includes individuals aged 18+ from the 1987-2000 waves N = aprox. 1.5 million obs, men and women **Methods:** Linear model		**-A 1 pp fall in the employment rate:** **-** Reduces obesity by 0.07pp - Reduces severely obese by 0.4pp - No effect on overweight No differences **by gender**		**-A 1 pp fall in the employment rate reduces:** - Smoking by 0.13pp - Smoking of at least 20 cigs/day by 0.10pp smoking at least 40 cig/day by 0.015pp **By gender:** The effect on smoking is stronger for females (0.17pp) than for males (0.09pp)		

Study and Data	Health status/ Health problem that limits work	Weight	Use of medical care / Health insurance	Smokes	Drinks	Mental health
Dee (2001) **Micro Data:** - BRFSS, 1984-1995 - N > 700,000, 'prime-age' men and women 18+ (average age is 45) **Methods:** Linear model					**A 5pp increase in UR:** - Reduces drinks per month by 3.5% and chronic drinking participation (60 or more drinks/month) by 19% - Binge drinking rises by 8% **By gender:** - The probability of binge drinking for males is >3 times larger than that for females	
Tekin, McClellan, and Minyard (2013) **Micro Data:** **-** BRFSS Sample: N=849,594, individuals in the Labor force, ages 25-55 **Methods:** Linear model	**A 1pp drop in ER:** - Probability of being in poor health rises by 0.00067 pp (4.8%) **By gender:** - Strongest effects on females: "excellent health" falls by 0.0044pp (1.8%) and poor health increases by 0.0015pp(10%)				**A 1pp drop in ER:** - Binge drinking (respondent reports had 60 or more drinks during the past month) falls by 0.0023pp **By gender:** - Effect on binge drinking is driven by women (0.0022pp)	

2. ***Studies Examining Men Only***

Study and Data	**Health status/ Health problem that limits work**	**Weight**	**Use of medical care / Health insurance**	**Smokes**	**Drinks**	**Mental health**
Charles and DeCicca (2008) **Micro Data:** - NHIS: Sample of working-aged men in the US living in "large" MSAs: 1997-2001 N=30,000-35,000 men of working age **Methods:** Linear model		**A 1 pp rise in the UR:** - Men with low ex-ante employment probabilities experience an increase in underweight by 0.5pp, in overweight by 3.5pp, and in obesity by 2.pp NO effects on men with high employment probability		**A 1 pp rise in the UR:** - Smoking rises by 2.7pp for those in the lowest employment decile - 2.3pp reduction for those most likely to be employed	**A 1 pp rise in the UR:** - Only for the group with highest employment probability drinking rises (3.6pp) - # of days with 5 drinks or more declines for all BUT it is NON significant	**A 1 pp rise in the UR:** - Leads to rises in: sadness (1.5pp), hopelessness (1.1pp), worthlessness (0.9pp), restlessness (1.2pp), nervousness (1.3pp), and feelings of effort (2.5pp) - Strongest effects for those least likely to be employed
Xu and Kaestner (2010) **Micro Data:** - BRFSS (1984- 2005, N=506,753) and NHIS (1976-2001, N=216,113), men between 25-55 **Methods:** Linear model			**A 2.5 % increase in employment:** - Decreases doctor visits by 1.5pp	**A 2.5 % increase in employment**: - Increases smoking by 1 pp - Increases smoking intensity (smokes >19 cigarettes a day y/n) by 2pp	**A 2.5 % increase in employment:** - Increases drinking by 0.1pp - Decreases binge drinking by 0.2pp	

3. Sample: Longitudinal data

Study and Data	OUTCOME VARIABLE					
	Health status /Health problem that limits work	**Weight**	**Use of medical care / Health insurance**	**Smokes**	**Drinks**	**Mental health**
Davalos and French (2011) **Micro Data:** - NESARC, PANEL, 2001/2002 and 2004/2005, men and women, ages: 18-59, prop. employed 78%; N = 26,313 **Methods:** Linear model, individual fixed-effects	**A 1% increase in UR:** OLS: - non-significant effects on physical health score Individual FE: - reduces physical health score by 0.9% No differences **by gender**					**A 1% increase in UR:** OLS: - reduces mental health score by 1.3% Individual FE: - reduces mental health score by 1.2% No differences **by gender**
Davalos, Fang, and French (2012) **Micro Data:** - NESARC, PANEL, 2001/2002 and 2004/2005, men and women, ages: 18-59, prop. employed= 64%; N = 34,120 **Methods:** - Logit, logit individual fixed-effects					**A 1pp increase in state UR:** Individual-FE: - Leads to a 1 binge drinking day increase per year - A 1.350 increase in the odds of driving after too much drink - A 1.167 increase in the odds of alcohol abuse/dependence No differences **by gender** (not shown)	

Table 2: Summary Statistics in FF

Variable	Full	Whites	Blacks	Hispanics	UR>6%	UR<=6%
Health outcomes:						
Health Excellent/V. Good	0.612	0.750	0.547	0.530	0.607	0.613
Health Limits Work	0.103	0.072	0.130	0.113	0.106	0.101
Obesity	0.320	0.195	0.402	0.386	0.348	0.302
Health Insurance	0.809	0.910	0.861	0.640	0.793	0.820
Smokes	0.302	0.369	0.338	0.199	0.295	0.307
>=4 Drinks 1 Time Last Yr.	0.126	0.206	0.083	0.108	0.126	0.127
Drugs use	0.053	0.063	0.063	0.039	0.062	0.046
Clinically depressed (liberal scale)	0.132	0.128	0.147	0.130	0.132	0.132
Race/ethnicity:						
White	0.284	1.000			0.265	0.298
Black	0.357		1.000		0.351	0.361
Hispanic	0.290			1.000	0.308	0.276
Other race	0.070				0.077	0.065
Immigrant	0.239	0.073	0.075	0.460	0.263	0.221
Education:						
<HS	0.271	0.116	0.286	0.455	0.284	0.262
HS	0.329	0.219	0.436	0.320	0.327	0.331
Some college	0.203	0.207	0.236	0.173	0.210	0.197
College or >	0.197	0.457	0.042	0.053	0.180	0.211
Marital Status:						
Married	0.519	0.818	0.231	0.502	0.517	0.520
Cohabiting	0.233	0.114	0.297	0.309	0.234	0.233
Single	0.248	0.068	0.472	0.189	0.249	0.247
Age	26.9 (6.2)	30.0 (6.1)	24.9 (5.8)	25.6 (5.7)	25.1 (5.9)	25.1 (6.0)
Income-to-needs ratio:						
<1	0.254	0.056	0.382	0.338	0.263	0.247
1-2	0.276	0.161	0.315	0.329	0.297	0.260
2-4	0.136	0.122	0.152	0.148	0.133	0.138
>=4	0.334	0.661	0.151	0.185	0.306	0.354
Employment status:						
Employed	0.478	0.573	0.471	0.400	0.469	0.486
Unemployed	0.175	0.070	0.274	0.185	0.171	0.177
Out of Labor Force	0.344	0.357	0.252	0.415	0.356	0.336
N pooled sample	***7,080***	***1,446***	***3,515***	***1,873***	***2,748***	***4,332***
N year 5	***3,829***	***773***	***1,887***	***1,035***	***931***	***2,898***
N year 9	***3,251***	***673***	***1,628***	***838***	***1,817***	***1,434***

Notes:

All characteristics are measured at baseline.
Sample includes mothers interviewed in years 5 and 9.
Numbers are weighted using baseline city weights.

Table 3: The Effect of the UR on Mother's Health in FF

	Health status Excellent or Very Good	Health problem limits work	Obesity	Any health insurance	Smokes	>=4 Drinks on 1 Occasion	Drug use	Clinically depressed
State UR								
LOGIT	0.933 [-1.755]	0.989 [-0.284]	1.024 [1.407]	0.987 [-0.334]	1.090 [1.181]	1.091 [1.852]	1.029 [0.471]	0.998 [-0.033]
LOGIT-FE	**0.848** **[-2.602]**	1.073 [0.661]	1.087 [0.712]	0.993 [-0.111]	**1.256** **[2.231]**	1.140 [1.521]	**1.400** **[2.499]**	0.941 [-0.791]
City UR								
LOGIT	0.916 [-1.951]	1.058 [1.365]	1.025 [1.237]	0.956 [-0.971]	1.088 [1.790]	1.062 [1.339]	1.128 [1.576]	0.994 [-0.107]
LOGIT-FE	**0.880** **[-2.112]**	1.154 [1.451]	1.038 [0.332]	1.002 [0.030]	**1.295** **[2.650]**	1.151 [1.640]	**1.394** **[2.738]**	0.938 [-0.851]
N	*7,080*	*7,070*	*6,178*	*7,064*	*7,079*	*7,070*	*7,058*	*7,067*
N changers	*953*	*364*	*511*	*758*	*359*	*491*	*322*	*591*
Indiv. Controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Bline State / City FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Year FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
Each coefficient comes from a separate regression.
Logit models control for mother characteristics (age, race, education, marital status), and state (city) and year fixed effects. Errors are clustered at the baseline state (city) level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Table 4: Logit-FE Estimates of Effects of State UR Using FF

	Health status Excellent or Very Good	Health problem limits work	Obesity	Any health insurance	Smokes	>=4 Drinks on 1 Occasion	Drug use	Clinically depressed
All	**0.848**	1.073	1.087	0.993	**1.256**	1.140	**1.400**	0.941
	[-2.602]	[0.661]	[0.712]	[-0.111]	**[2.231]**	[1.521]	**[2.499]**	[-0.791]
White	0.909	0.939	**0.508**	1.034	1.512	**1.594**	1.230	**0.663**
	[-0.691]	[-0.252]	**[-2.091]**	[0.221]	[1.571]	**[2.535]**	[0.759]	**[-2.402]**
Black	**0.687**	1.310	1.358	0.848	1.227	1.148	**1.703**	0.865
	[-3.009]	[1.532]	[1.312]	[-1.165]	[1.121]	[0.672]	**[2.456]**	[-1.002]
Hispanic	0.933	1.157	1.151	1.061	1.060	1.073	1.902	**1.301**
	[-0.781]	[0.792]	[0.850]	[0.651]	[0.341]	[0.564]	[1.602]	**[1.982]**
Married	1.054	0.663	0.761	1.064	0.903	1.079	1.656	**0.596**
	[0.342]	[-1.245]	[-0.993]	[0.334]	[-0.321]	[0.331]	[1.340]	**[-2.371]**
Unmarried	**0.811**	1.146	1.197	0.964	**1.310**	1.128	1.292	1.018
	[-2.940]	[1.191]	[1.331]	[-0.520]	**[2.462]**	[1.291]	[1.732]	[0.211]
More than HS	0.858	**0.566**	1.16	0.872	**1.655**	1.116	1.400	0.771
	[-1.301]	**[-2.274]**	[0.451]	[-1.147]	**[2.119]**	[0.742]	[1.291]	[-1.950]
HS or less	**0.856**	**1.364**	1.127	1.047	1.144	1.162	**1.413**	1.062
	[-1.971]	**[2.353]**	[0.916]	[0.589]	[1.164]	[1.391]	**[2.144]**	[0.601]
N	*7,080*	*7,070*	*6,178*	*7,064*	*7,079*	*7,070*	*7,058*	*7,067*
Indiv. Controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Baseline State FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Year FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
Each coefficient comes from a separate regression.
Logit models control for mother characteristics (age, race, education, marital status), and state and year fixed effects. Errors are clustered at the baseline state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Appendix

Appendix Table 5: Logit-FE Estimates of Effects of State ER Using FF

	Health status Excellent or Very Good	Health problem limits work	Obesity	Any health insurance	Smokes	>=4 Drinks on 1 Occasion	Drug use	Clinically depressed
All	1.043 [1.164]	0.995 [-0.09]	0.924 [-1.191]	1.023 [0.530]	0.956 [-0.774]	0.919 [-1.365]	0.902 [-1.576]	1.015 [0.341]
White	0.812 [-1.700]	1.342 [1.708]	0.927 [-0.331]	1.030 [0.238]	0.961 [-0.265]	0.800 [-1.862]	0.920 [-0.531]	**1.430** **[2.611]**
Black	1.006 [0.142]	0.967 [-0.492]	0.975 [-0.312]	1.081 [1.396]	0.983 [-0.228]	1.022 [0.261]	0.873 [-1.676]	1.021 [0.352]
Hispanic	1.043 [1.155]	0.995 [-0.094]	0.821 [-1.142]	0.835 [-1.844]	1.044 [0.249]	0.878 [-1.075]	1.009 [0.031]	**0.706** **[-2.764]**
Married	0.932 [-0.857]	1.045 [0.337]	0.783 [-1.292]	0.877 [-1.183]	1.075 [-0.421]	0.843 [-1.261]	-	**1.278** **[2.004]**
Unmarried	1.070 [1.643]	0.990 [-0.165]	0.940 [-0.863]	1.062 [1.281]	0.930 [-1.132]	0.961 [-0.660]	0.874 [-1.772]	0.981 [-0.381]
More than HS	0.963 [-0.588]	**1.284** **[2.279]**	1.006 [0.043]	0.999 [-0.013]	0.995 [-0.04]	0.891 [-1.190]	0.966 [0.281]	**1.291** **[2.742]**
HS or less	1.080 [1.714]	0.899 [-1.599]	0.895 [-1.439]	1.031 [0.621]	0.941 [-0.904]	0.953 [-0.718]	0.871 [0.070]	0.934 [-1.241]
N	*7,080*	*7,070*	*6,178*	*7,064*	*7,079*	*7,070*	*7,058*	*7,067*
Indiv. controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Baseline State FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Year FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
Each coefficient comes from a separate regression.
Logit models control for mother characteristics (age, race, education, marital status), and state and year fixed effects.
Errors are clustered at the baseline state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Appendix Table 6: Logit-FE Estimates of Effects of Current State of Residence UR in Using FF

	Health status Excellent or Very Good	Health problem limits work	Obesity	Any health insurance	Smokes	>=4 Drinks on 1 Occasion	Drug use	Clinically depressed
All	**0.853**	1.091	1.073	0.992	**1.220**	1.108	**1.355**	1.019
	[-2.644]	[0.827]	[0.632]	[-0.125]	**[2.046]**	[1.251]	**[2.509]**	[0.258]
White	0.931	1.086	0.824	1.008	1.459	1.216	1.232	0.767
	[-0.442]	[0.328]	[-0.722]	[0.052]	[1.616]	[1.152]	[0.899]	[-1.593]
Black	**0.706**	1.321	1.175	0.933	1.149	1.276	**1.480**	0.955
	[-3.138]	[1.644]	[0.772]	[-0.558]	[0.832]	[1.338]	**[2.134]**	[-0.372]
Hispanic	0.925	1.067	1.072	1.046	1.076	1.058	1.942	**1.339**
	[-0.915]	[0.359]	[0.434]	[0.495]	[0.423]	[0.455]	[1.669]	**[2.170]**
Married	1.080	0.588	0.782	0.983	1.019	0.951	1.734	0.715
	[0.547]	[-1.622]	[-1.030]	[-0.097]	[0.060]	[-0.220]	[1.630]	[-1.700]
Unmarried	**0.807**	1.205	1.186	0.968	**1.278**	1.120	1.225	1.095
	[-3.146]	[1.609]	[1.299]	[-0.477]	**[2.327]**	[1.279]	[1.508]	[1.106]
More than HS	0.882	**0.599**	1.347	0.924	1.359	1.104	1.441	0.881
	[-1.151]	**[-2.091]**	[1.009]	[-0.738]	[1.461]	[0.677]	[1.563]	[-1.016]
HS or less	**0.850**	**1.319**	1.088	1.026	1.155	1.120	**1.341**	1.122
	[-2.222]	**[2.160]**	[0.673]	[0.334]	[1.297]	[1.100]	**[1.991]**	[1.195]
N	*7,080*	*7,070*	*6,178*	*7,064*	*7,079*	*7,070*	*7,058*	*7,067*
Indiv. controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
State FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Year FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
Each coefficient comes from a separate regression.
Logit models control for mother characteristics (age, race, education, marital status), and state and year fixed effects.
Errors are clustered at the state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Appendix Table 7 – The Propensity to Attrite in Year 9 Explained by the UR in Year 5 and Women's Characteristics

	(1)	(2)
UR	**1.711**	5.291
	[2.061]	[1.001]
UR * Mother's Age <19		1.001
		[0.006]
UR * Mother's Age 20-23		0.979
		[-0.208]
UR * Mother's Age 24-27		0.991
		[-0.118]
UR * Mother's Age 28-32		1.001
		[0.021]
UR * Mother is Black		0.821
		[-1.187]
UR * Mother is Hispanic		0.774
		[-1.129]
UR * Mother is other race/ethn		0.787
		[-1.693]
UR * Mother is immigrant		1.062
		[0.338]
UR * Mother is single		0.814
		[-1.015]
UR * Mother cohabitates		0.894
		[-0.616]
UR * Mother's Educ HS		0.905
		[-0.992]
UR * Mother's Educ Some College		**0.819**
		[-3.733]
UR * Mother's Educ College		0.759
		[-1.131]
UR * Mother's income-to-needs ratio <1		1.014
		[0.150]
UR * Mother's income: 1-2		1.099
		[0.718]
UR * Mother's income: 2-4		1.111
		[0.662]
UR * Child's Age in months		0.988
		[-0.510]
N	3,797	3,797
Indiv. controls	Y	Y
Baseline state FE	Y	Y
Year FE	Y	Y

Note:

Each column is a separate regression.
Sample includes year 9 data as a cross section.
The state UR is measured in year 5.
All covariates (mother's age, race/ethnicity, education, marital status, income) are measured at baseline. Errors are clustered at the state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Appendix Table 8 - The Propensity to Attrite in Year 9 Explained by UR and Mother's Health in Year 5

	(1)	(2)
UR	1.727	1.747
	[1.754]	[1.765]
UR * Health is Excellent or V. good		0.989
		[-0.122]
UR * Health problem limits work		0.749
		[-1.605]
UR * Obesity		**1.321**
		[4.201]
UR * Any health insurance		0.882
		[-1.920]
UR * Smokes		1.088
		[1.036]
UR * 4>= Drinks in 1 Occasion		0.916
		[-0.740]
UR * Uses drugs		1.207
		[1.777]
UR *Clinically depressed		1.016
		[0.114]
N	3,472	3,472
Indiv. controls	Y	Y
Baseline state FE	Y	Y
Year FE	Y	Y

Note:
Each column is a separate regression.
The state UR and all health variables (health status, health problem that limits work, obesity, etc.) are measured in year 5.
All covariates (mother's age, race/ethnicity, education, marital status, income) are measured at baseline. Errors are clustered at the state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.

Appendix Table 9 - Individual Fixed-Effects Estimates of City UR on Mother's, Current Partner's, and Father's Labor Market Outcomes in FF

	Mother			Current Partner[1]		Father		
	Unemployed	Employed	Weeks worked	Unemployed	Employed	Unemployed	Employed	Weeks worked
All	**1.12**	**0.90**	-0.28	**1.22**	**0.81**	**1.14**	**0.87**	**-0.67**
	[4.31]	**[-4.50]**	[-1.82]	**[3.57]**	**[-4.55]**	**[3.43]**	**[-4.14]**	**[-4.02]**
Whites	1.01	0.93	0.62	1.20	0.82	**1.30**	**0.78**	-0.40
	[0.13]	[-1.28]	[1.84]	[1.35]	[-1.83]	**[2.45]**	**[-2.63]**	[-1.39]
Blacks	**1.10**	**0.90**	**-0.67**	1.20	**0.79**	1.07	0.93	**-0.79**
	[2.48]	**[-3.02]**	**[-2.70]**	[1.78]	**[-2.89]**	[1.11]	[-1.48]	**[-2.56]**
Hispanics	**1.12**	**0.90**	-0.06	**1.22**	**0.82**	**1.20**	**0.82**	**-0.67**
	[2.47]	**[-2.65]**	[-0.20]	**[2.26]**	**[-2.84]**	**[2.46]**	**[-3.17]**	**[-2.43]**
Married	1.09	0.94	-0.01	**1.28**	0.85	**1.27**	**0.81**	-0.44
	[1.20]	[-1.30]	[-0.05]	**[2.02]**	[-1.73]	**[2.24]**	**[-2.44]**	[-1.79]
Unmarrried	**1.12**	**0.90**	-0.35	**1.21**	**0.80**	**1.12**	**0.88**	**-0.78**
	[4.20]	**[-4.31]**	[-1.93]	**[2.99]**	**[-4.26]**	**[2.81]**	**[-3.45]**	**[-3.60]**
More than HS	**1.13**	**0.90**	-0.17	1.24	**0.80**	1.13	**0.84**	-0.41
	[2.23]	**[-2.61]**	[-0.67]	[1.92]	**[-2.54]**	[1.61]	**[-2.63]**	[-1.72]
HS or less	**1.11**	**0.90**	-0.34	**1.21**	**0.82**	**1.14**	**0.88**	**-0.83**
	[3.63]	**[-3.68]**	[-1.74]	**[2.92]**	**[-3.75]**	**[2.91]**	**[-3.15]**	**[-3.59]**
N	*16,214*	*16,214*	*15,721*	*2,966*	*2,966*	*11,865*	*11,865*	*11,606*
N changers	*6,637*	*8,676*	*4,705*	*181*	*226*	*919*	*1,211*	*4,021*
Baseline city FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Wave FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
Source: Garfinkel and Pilkauskas (2013)
Each coefficient comes from a separate regression.
Models pool data from years 1, 3, 5, and 9, use UR at the city level, and control for wave dummies, and mother-individual fixed effects.
Coefficients are reported as odds ratios. Models for "weeks worked" are obtained using linear regressions.
T-statistics are shown in parenthesis; bold font indicates that the result is statistically significant at the 95% level of confidence.
[1]Weeks worked were not reported for current partner.

Appendix Table 10 - Summary Statistics in FF and BRFSS

Variable		FF	BFRSS[1]
Age:		26.9	36.4
		(6.2)	(8.8)
Race/Ethnicity:	**White**	0.284	0.404
	Black	0.357	0.172
	Hispanic	0.290	0.337
	Other race	0.070	0.080
	Immigrant	0.239	
Education:	**<HS**	0.271	0.195
	HS	0.329	0.242
	Some college	0.203	0.246
	College or >	0.197	0.316
Marital Status:	**Married**	0.519	0.611
	Cohabiting	0.233	0.061
	Single[2]	0.248	0.326
Income[3,4]:	**1**	0.254	0.237
	2	0.276	0.192
	3	0.136	0.244
	4	0.334	0.253
Employment status:	**Employed**	0.478	0.570
	Unemployed	0.175	0.092
	Out of Labor Force	0.344	0.337
N pooled sample		***7,080***	***4,921***

Note:
In FF, all characteristics are measured at baseline; in BRFSS these are measured in the pooled sample.
Numbers are weighted using baseline city weights in person specific weights in BRFSS.
[1] Sample includes mothers with children born between 1998 and 2000, in the urban areas of FF baseline states (center city of MSA). Given that child's age (and urban indicator) is only available since 2005, the sample is restricted to 2005-2010 and 13 states (TN and MA not included).
[2] In BRFSS single includes single, divorced, and widowed women.
[3] In FF income levels are: 1) <1 income-to-needs ratio; 2) 1-2; 3) 2-4; 4) >=4.
[4] In BRFSS income levels are: 1) Less than $20,000; 2) between $20,000 and $35,000; 3) between $35,000 and $75,000; 4) more than $75,000.

Appendix Table 11 - Survey Questions in FF and BRFSS

	FF	BRFSS
Physical health		
Health status	**In general, how is your health? Would you say it is:** A. Excellent B. Very good C. Good D. Fair E. Poor	**Would you say that in general your health is:** A. Excellent B. Very good C. Good D. Fair E. Poor
Health problem that limits work	**Do you have a serious health problem that limits the amount or kind of work you can do?** Y/N	**Are you limited in any way in any activities because of physical, mental, or emotional problems?** Y/N
Obese	**Based on weight/height we compute a mother's BMI**	**Based on weight/height we compute a mother's BMI**
Has health insurance	**Are you currently covered by Medicaid or by another public, federal, or state assistance program, or by a private health insurance plan?** Y/N	**Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare?** Y/N
Health behaviors		
Smokes	**In the past month did you smoke cigarettes?** Y/N	**Smoking status?** A. Never smoked B. Former smoker C. Now smokes some days D. Now smokes everyday
Binge drinking	**What is the largest number of drinks you had in any single day during the past twelve months?** A. 0 B. 1-3 C. 4-10 D. 11-20 E. >20	**Do you have four or more drinks on one occasion?** Y/N
Drug use	**Did you use any of the drugs in list (see footnote 9) "on your own", during the past twelve months?** Y/N	
Mental health		
Depressed	**Clinically depressed: This assessment is conducted by specialists (see footnote 11)**	**For how many days during the past 30 days was your mental health (including stress, depression, and problems with emotions) not good?** A. 0 B. # of days (from 1 to 30)

Appendix Table 12: Logit Estimates of Effects of State UR Using BRFSS

	Health status Excellent or Very Good		Health problem limits work		Obesity		Any health insurance		Smokes		>=4 Drinks on 1 Occasion		Depressed[1]	
	BRFSS	**FF**	**BRFSS**	**FF**	**BRFSS**	**FF**	**BRFSS**	**FF**	**BRFSS**	**FF**	**BRFSS**	**FF**	**BRFSS**	**FF**
All	1.014	**0.848**	0.950	1.073	1.019	1.087	0.950	0.993	0.949	**1.256**	0.939	1.140	0.992	0.941
	[0.507]	**[-2.602]**	[-1.241]	[0.661]	[0.450]	[0.712]	[-1.191]	[-0.111]	[-1.084]	**[2.231]**	[-1.732]	[1.521]	[-0.201]	[-0.791]
White	1.058	0.909	1.017	0.939	1.007	**0.508**	**0.790**	1.034	0.995	1.512	0.909	**1.594**	1.059	**0.663**
	[1.482]	[-0.691]	[0.312]	[-0.252]	[0.226]	**[-2.091]**	**[-2.037]**	[0.371]	[-0.112]	[1.571]	[-1.301]	**[2.535]**	[1.131]	**[-2.402]**
Black	1.009	**0.687**	0.817	1.310	1.014	1.358	1.071	0.848	**0.807**	1.227	0.938	1.148	**0.872**	0.865
	[0.082]	**[-3.009]**	[-1.501]	[1.532]	[0.203]	[1.312]	[0.643]	[-1.165]	**[-2.523]**	[1.121]	[-0.992]	[0.672]	**[-3.152]**	[-1.002]
Hispanic	1.045	0.924	1.074	1.058	**1.090**	**1.063**	1.007	1.001	0.979	1.066	0.998	**1.102**	0.987	**1.170**
	[1.033]	[-1.812]	[0.923]	[0.960]	**[4.362]**	**[2.567]**	[0.111]	[0.042]	[-0.192]	[1.721]	[-0.023]	**[2.352]**	[-0.182]	**[4.971]**
Married	1.033	1.054	0.996	0.663	1.001	0.761	0.975	1.064	1.109	0.903	0.888	1.079	1.022	**0.596**
	[0.084]	[0.342]	[-0.003]	[-1.245]	[0.037]	[-0.993]	[-0.376]	[0.334]	[0.990]	[-0.321]	[-1.841]	[0.331]	[0.571]	**[-2.371]**
Unmarried	1.000	**0.811**	0.902	1.146	1.033	1.197	0.921	0.964	**0.858**	**1.310**	1.011	1.128	0.952	1.018
	[0.00]	**[-2.940]**	[-0.950]	[1.191]	[0.484]	[1.331]	[-1.281]	[-0.520]	**[-3.626]**	**[2.462]**	[0.158]	[1.291]	[-0.762]	[0.211]
More than HS	1.056	0.858	0.932	**0.566**	0.961	1.160	1.032	0.872	0.944	**1.655**	**0.912**	1.116	1.102	0.771
	[1.216]	[-1.301]	[-0.714]	**[-2.274]**	[-0.652]	[0.451]	[0.509]	[-1.147]	[-0.741]	**[2.119]**	**[-2.001]**	[0.742]	[0.382]	[-1.950]
HS or less	0.982	**0.856**	0.954	**1.364**	1.103	1.127	0.911	1.047	0.966	1.144	0.99	1.162	0.948	1.062
	[-0.442]	**[-1.971]**	[-0.379]	**[2.353]**	[1.759]	[0.916]	[-1.273]	[0.589]	[-0.551]	[1.164]	[-0.102]	[1.391]	[-1.012]	[0.601]
N	*4,908*	*7,080*	*4,910*	*7,070*	*4,583*	*6,178*	*4,913*	*7,064*	*4,911*	*7,079*	*4,321*	*7,070*	*4,921*	*7,067*
Indiv. controls	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
State FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Year FE	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**

Note:
BRFSS results were estimated using a linear model while those from FF were estimated using individual-fixed effects.
Each coefficient comes from a separate regression.
Logit models control for mother characteristics (age, race, education, marital status), and state and year fixed effects. Errors are clustered at the state level.
T-statistics are shown in brackets; bold font indicates that the result is statistically significant at the 95% level of confidence.
[1] In BRFSS the measure for depression is "Depressed, sad, blue for 2-weeks in the last-year", whereas in FF the measure is Clinically depressed.