Are Recessions Good For Children's Health?

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I. Introduction

In this paper, we investigate the extent to which changes in labor market opportunities affect children's health. An extensive literature documents that negative shocks to labor market demand are, perhaps counter-intuitively, associated with reductions in mortality, and improvements in adult health.[1] We know very little about how children's health responds to changes in labor market conditions, however.[2] Understanding this relationship is important, as health in early life is increasingly appreciated as a significant input to human capital development, and a determinant of long-term health and socio-economic status (Almond and Currie, 2011). A contemporaneous relationship between labor market opportunities and children's health may, therefore, have important implications for the wellbeing of the next generation of workers.

Economic theory does not provide clear predictions about the sign of this relationship. On the one hand, decreases in family income that typically accompany a labor market contraction should lead to reductions in parental investments in children's health.[3] On the other hand, declining labor market opportunities are associated with reductions in the opportunity cost of parental time investments, which might increase children's health by causing parents to substitute parental care for market-based childcare (reducing their children's exposure to infectious diseases, for example) or through increases in other time-intensive health investments. Both recessions and individual job loss have been linked to declines in adult mental health (e.g. Dooley and Catalano, 1984; Dooley, Catalano and Rook, 1988; Fenwick and Tausig, 1994;

[1] A non-exhaustive list of studies includes Ruhm (2000, 2003, 2005a, 2005b), Ruhm and Black (2002), Evans and Graham (1988), Gruber and Frakes (2006), Stevens et. al, (forthcoming), Xu (2013).
[2] Two exceptions are Dehejia and Lleras Muney (2004), and Lindo (2015). Both of these studies focus on infant health (mortality and birthweight).
[3] Similarly, reductions in employer provided health insurance coverage, which also accompany labor market contractions, may lead to reductions in children's health.

Schaller and Stevens, 2014), which may affect children's health either directly or indirectly (Conger and Conger, 2007). When combined with cyclical changes in environmental contributors to children's health such as pollution, the multitude of potentially changing within-family inputs leaves the overall relationship as an empirical question.

Moreover, recent evidence suggests that these mechanisms may operate differently through mothers and fathers. An extensive literature finds that maternal employment is detrimental to children's health (Anderson, Butcher, and Levine, 2003, Gennetian et al., 2010, Morrill 2011), while Lindo (2011) finds that infant health declines in the wake of a paternal job loss. Few studies consider the impacts of mothers' and fathers' employment conditions simultaneously, but recent research suggests that children's health outcomes respond differently to mothers' vs. fathers' job displacements (Liu and Zhao, 2011, Schaller and Zerpa, 2014). Common throughout each of these strands of literature is the challenge of endogeneity. In particular, child health is likely to influence family income and labor supply decisions and these factors are likely to be correlated with unobservable preferences and attributes of children and families. The literature also highlights important differences between the effects of family income and the effects of changes in parental (especially maternal) time use.

This paper makes three contributions. First, we are among the first to provide estimates of the relationship between cyclical changes in labor market opportunities and children's health in the United States. Using data from the National Health Interview Survey and state-year unemployment rates, we examine the effect of employment opportunities on a wide variety of outcomes for children, including general ratings of health, activity limitations, and the incidence of specific health conditions. Second, in order to address the potential endogeneity of aggregate unemployment rates, we generate predicted employment growth rates that exploit variation in base-period industry employment shares across states, together with national rates of employment growth across industries. These “shift-share” indices, which are similar to those used by Bartik (1991), Katz and Murphy (1992) and Blanchard and Katz (1992), and others, allow us to isolate variation in child health due to demand-induced changes in labor market opportunities. Finally, using a variation on this “shift-share” strategy, we use gender-specific predicted employment growth rates to estimate the effects of changes in labor market opportunities for men and women separately.

Our findings are summarized with two broad conclusions. First, unlike most studies that focus on adult health, we find no systematic evidence that general labor demand conditions correlate with contemporaneous measures of children’s health outcomes. This empirical result, which is robust to the choice of dependent and explanatory variables and to a number of alternative regression specifications, also contrasts with previous analyses that have documented a positive relationship between unemployment rates and infant mortality. Second, we find that focusing on a broad measure of employment opportunities obscures the true extent to which the labor market affects children. Specifically, we find consistent evidence that improvements in men’s labor market conditions are associated with improvements in many measures of children’s health, while improvements in women’s labor market conditions have negative effects that are of similar or larger magnitude. The correlation between children’s health and a gender-inclusive measure of employment opportunities averages together these positive and negative associations, and masks important underlying patterns. One possible interpretation of these patterns is that mothers and fathers may typically provide different inputs into the production of children’s health, with mothers making relatively larger time investments, and fathers providing higher levels of monetary support. The income losses that are associated with negative employment shocks are accompanied by increases in the amount of time that parents have available to invest in child care related activities, but the balance between these two effects is likely to be different for mothers and fathers. These findings underscore the importance of both monetary and time inputs in the production of children's health.

The remainder of our paper is organized as follows. In section II we provide a review of the related literature, showing that there are substantial reasons to expect that labor market opportunities might affect children's health, and that the impact of male and female employment conditions might be expected to differ. In section III we describe our data. We then explain our empirical framework in section IV, where we also describe the "shift-share" approach that we take towards addressing potential endogeneity. Section V provides our results, and Section VI concludes.

II. Background

Many studies have documented that higher unemployment rates are associated with reductions in mortality (Ruhm, 2000; Ruhm, 2003; Ruhm, 2005a; Ruhm, 2005b) and improvements in other measures of adult health (Ruhm, 2003; 2005). This relationship is often thought to result from improvements in health-related behaviors that occur as a result of changes in the opportunity cost of time that accompany declining labor market opportunities (Evans and Graham, 1988; Ruhm, 1996; Ruhm and Black, 2002; Ruhm, 2005; Gruber and Frakes, 2006; Freeman, 1999; Xu, 2013).[4] Nearly all of these studies focus on adult health, but mortality is known to vary cyclically across all age groups. Stevens et. al. (forthcoming), for example, find that a one percentage point increase in the unemployment rate is associated with a 0.3% reduction in mortality overall, but a 1.4% reduction in mortality among children between the

[4] An exception is Stevens et. al. (forthcoming) who note that most of the cyclically induced deaths are among older individuals, for whom the opportunity cost of time is not likely to be strongly affected by changes in labor demand.

ages of 0 and 4, and a statistically insignificant reduction of 0.04% among adults between the ages of 45 and 61. This suggests that, relative to adults, children's health may be particularly sensitive to cyclical variation in labor market conditions.

To our knowledge, the only study to date that has focused on the impact of aggregate economic conditions on children's health is that of Dehejia and Lleras-Muney (2004). Using U.S. vital statistics data, they document that higher unemployment rates are associated with reductions in infant mortality and in the incidence of low and very low birthweight, which they attribute to both positive selection and changes in maternal health behaviors, such as smoking and drinking. They conclude that changes in the opportunity cost of women's time may be an important determinant of cyclical changes in health during pregnancy, and more generally suggest that reducing the opportunity cost of maternal time inputs may be a possible mechanism for improving children's health outcomes.

Dehejia and Lleras-Muney's conclusion is echoed in a much larger literature that focuses on identifying the effect of maternal employment on children's health outcomes. That literature, largely framed in the context of understanding the implications of long-term trends in women's labor force participation, generally finds that mothers' employment negatively affects children's health. An empirical challenge faced by all of these studies, however, is that mothers' labor supply decisions may be partly determined by unobserved factors that also affect their children's outcomes. While two recent studies make some headway on this endogeneity problem--Gennetian et al. (2010) use experimental variation in maternal work incentives that was generated by the 1990s welfare to work experiments, and Morrill (2011) uses variation in maternal employment induced by the youngest child's eligibility for kindergarten—there is a dearth of causal evidence on the effect of maternal employment on children's health.

Many fewer studies directly investigate the impact of father's employment, but among those that do, there is no evidence that paternal employment has negative effects on children's health, and there is some suggestive evidence that is has positive causal effects (Anderson et al., 2003; Phipps et al., 2006; Morrissey et al., 2011). Lindo (2011), for example, compares the birth weight of infants born before vs. after a paternal job displacement, and finds that father's job loss reduces infant birthweight by over four percent. When considered together with the literature on the maternal employment, this finding suggests that mothers and fathers may influence the production of children's health very differently. Two recent studies that consider the impacts of mothers and fathers job loss simultaneously provide further evidence in this regard: Schaller and Zerpa (2014) find that maternal job loss is associated with reductions in the incidence of infections (particularly ear infections among pre-school aged children), while paternal job loss is more detrimental to the mental health of older children. Liu and Zhao (2011) examine the impacts of job displacement in China and find that while mother's job loss has no effect on children's height and weight, father's job loss has a negative impact.

There are a number of reasons that mothers' and fathers' job losses may have different effects on the production of child health. Even conditional on work status, mothers spend approximately twice as much time engaged in child care related activities as do fathers (Guryan, Hurst and Kearney, 2008; Kalil and Ziol-Guest, 2013), and more of that time is devoted to routine care (Bryant and Zick, 1993; Pleck, 1997). Changes in mothers' employment status may, therefore, have larger impacts on time inputs into children's health. Recent research suggests, that, indeed, recession induced declines in work generate relatively larger increases in the amount of time mothers spend with their children (Aguiar, Hurst and Karabarbounis, 2013).

These findings suggest that if parental time inputs are important to the production of children's health then a mother's job loss may have a more positive effect than a father's job loss.

On the other hand, in the majority of American families, husbands' earnings contribute more to household income than wives' earnings (Bertrand, 2015). For most families, therefore, a father's job displacement will generate a larger shock to family income. Given the well documented, positive, correlation between income and health (Case, Lubotsky and Paxson, 2002), the income losses associated with a paternal job loss might have a negative impact on child health that exceeds that of a maternal displacement. Similarly, paternal job loss might also have a larger effect on the level of stress that a family experiences. Existing studies have shown that negative employment shocks are associated with reductions in adult mental health (Brand et al., 2008; Browning and Heinesen, 2012; Schaller and Stevens, 2014) and impaired family functioning (Conger et. al., 1994). The Family Stress Model (Conger, et. al, 1994) predicts that this will have a direct, negative, effect on children's outcomes.

In addition to hinting that male and female employment opportunities may have different effects on children's health, the opposing mechanisms outlined above make it difficult to predict the sign of the relationship between overall labor market opportunities and children's health. It is also important to keep in mind that parental job loss is only one route by which labor market conditions might affect children's health. Recessions lead to changes in time use, reduced earnings and wealth, and higher stress levels even among parents who hold onto their jobs (Dooley and Catalano, 1984; Dooley, Catalano and Rook, 1988; Fenwick and Tausig, 1994; Kalil and Ziol-Guest, 2013; Morrill and Pabilonia, 2012). If such channels are important to children's health outcomes then studies that focus on the impacts of parental job displacement may understate the overall effects that result from labor market contractions. Labor market contractions may also affect children's health through environmental, rather than family level changes. For example, a growing body of research documents that manufacturing induced changes in pollution affect children's health.[5]

III. Data

Our analyses are based on data from the 1997-2012 National Health Interview Survey (NHIS), which is one of the primary surveys used to monitor health trends in the United States population. The NHIS is a repeated cross-sectional survey that collects and provides health information on 34,000-40,000 families each year. We use the restricted use version of the NHIS because the public use version does not include state identifiers, which are necessary to our identification strategy: a child's state of residence is required to assign the relevant state/year labor market variables.

The NHIS has two components that we make use of in our analyses. The Person-Core questionnaire includes demographic and health data for each member in each surveyed household. The Sample Child questionnaire includes more detailed questions about health and well-being for one randomly sampled child from each household. The answers to these more detailed questions are provided by a knowledgeable adult, who is the child's parent more than 90 percent of the time. We include in our main sample all children between the ages of 0 to 17 (or 5 to 17 for school-related outcomes).

We focus on a set of health outcomes that are relatively common among children and have a reasonable likelihood of exhibiting transitory fluctuations over time. To begin with, we estimate the relationship between aggregate labor market opportunities and three general measures of

[5] e.g. Almond, Edlund and Palme, 2009; Chay and Greenstone, 2003a; Chay and Greenstone 2003b; Currie and Neidell, 2005; Currie, Neidell and Schmieder, 2009; Currie and Walker, 2011; Currie and Schmieder, 2009; Knittel, Miller and Sanders 2011; Reyes, 2007; Sanders, 2012.

overall health; 1) whether the parent reports that the child is in excellent health, 2) the number of days in the last year that a child over the age of 5 has missed school due to illness, and 3) whether the child currently has a health condition that limits their activities.[6] The indicator for "excellent" health status comes from a survey question where parents are asked to rank the health of their children on a scale of one to five with one being excellent and five being poor. Roughly 50% of the sample reports that their children are in excellent health, making "excellent health" a natural way to bifurcate the data. That being said, the results follow a similar pattern when we use the 1-5 point scale of reported health as the dependent variable.

We also examine the effect of labor demand conditions on a set of more narrowly defined health outcomes. Our choice of specific health conditions is motivated in part by the Agency of Health Care Research and Quality's (AHRQ) ranking of childhood health conditions by total expenditures (Soni 2014). According to this publication, the five most costly childhood health conditions are: mental disorders, asthma, trauma related disorders, respiratory infections, and ear infections. As a large share of costs related to these health outcomes is born outside of the household (for example, according to Soni (2014), over half of total expenditures on asthma and mental health were paid for by Medicaid in 2011), changes in the incidence of these conditions may have important policy implications. In our data, we currently identify (1) whether a child has experienced severe emotional difficulties in the last year, (2) whether a child has had an asthma attack in the last year, and (3) whether the child has experienced an injury in the last year. We have plans to add infectious illnesses, including respiratory infections and ear infections to our data in the future.

[6] Out of the outcomes that we consider, only parent-reported health (1-5 scale), activity limitations, and injuries are part of the Person-Core questionnaire and are available for every child in the NHIS sample. All other health outcomes that we consider are from the Sample Child questionnaire, and are reported for one randomly selected child per household.

Each of the specific health outcomes that we consider is plausibly linked to labor market conditions through changes in family income, parental time use, and family stress. For example, changes in child mental health are most likely to be directly related to their parents' mental health,[7] while changes in the incidence of injuries and infectious illness are more likely to be a result from changes in children's time use. Schaller and Zerpa (2014) find that, on average, children's mental health gets worse following parental job loss, while their likelihood of contracting an infectious illness falls, which is consistent with the theory that different mechanisms are at play.

Meanwhile there are a multitude of potential mechanisms linking economic conditions to the incidence of asthma among children. For example, childhood asthma attacks are known to be triggered by air pollutants, the level of which varies with aggregate economic activity, and parental stress has been found to enhance the effect of environmental pollution on childhood asthma incidence (Shankardass et al., 2009). Exposure to dust, animal hair, cockroaches, and molds is associated with asthma attacks (Institute of Medicine, 2000), and such factors are linked to the cleanliness of a home, possibly becoming more prevalent when parents spend less time at home. Childhood asthma attacks have also been linked with exposure to second hand smoke (Sabia 2008), and there is evidence that adult smoking also fluctuates with the business cycle (Ruhm, 2005b). Finally, the incidence of asthma symptoms may depend on children's level of physical activity. Though we are unable to precisely identify the relative contributions of the mechanisms described above to each of the health outcomes that we consider, throughout our analysis we acknowledge that the relative importance of different mechanisms depends on the condition considered and interpret our findings accordingly.

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[7] Several existing studies have linked adult mental health to aggregate economic conditions, including Blanchflower and Oswald, 1994; Dooley and Catalano, 1984; Dooley, Catalano and Rook, 1988; Fenwick and Tausig, 1994.

We collapse the NHIS data to state-age-year cells that are ultimately merged with state and time varying economic and demographic data obtained from other sources. For all of our dichotomous outcomes we multiply them by 100 for ease of reading. Given that most children have zero injuries, we also multiply number of injuries by 100, such that the mean of 2.40 injuries represents there being 2.4 injuries per 100 children. State annual unemployment rates are provided by the Bureau of Labor Statistics. The "shift share" indices, described in detail below, are created using data from the decennial Census and Current Population Surveys. State-level population estimates and demographic control variables are generated using the National Cancer Institute's Surveillance, Epidemiology and End Results Program (SEER). Table 1 shows summary statistics for our key outcomes, labor market indicators, and demographic controls.

IV. Empirical Framework

III.A. Estimating Equations

We estimate a state panel data model that leverages variation across US states in the timing and severity of business cycles. Initially, we follow the existing literature, and use the state-year unemployment rate as our measure of local labor market conditions. We estimate a variant of a difference-in-differences model that allows us to compare health outcomes among children living in a state that is experiencing a labor market contraction to those living in the same state when employment opportunities are better, while controlling for nationwide shocks. Specifically, we estimate:

$$Y_{ast} = \emptyset_s + \emptyset_{at} + \beta U_{st} + \pi X_{st} + \varepsilon_{ast} \qquad (1)$$

Where Y_{ast} represents an average health outcome for children currently age a, living in state *s*, observed in year *t;* $\emptyset_{\boldsymbol{s}}$ is a vector of state fixed-effects, which allows us to control for unobserved differences across states, and $\emptyset_{at}$ is a vector of age-year fixed effects. U_{st} is the unemployment rate in state s in year t, and X_{ist} is a vector of individual controls that includes the parents' marital status, child race, child gender, and mother's education. In some of our regressions we also include state specific linear time trends to control for unobserved variables correlated with health that trend linearly over time within states. In other specifications we include a number controls for state and time varying demographic factors that may be correlated with both labor market conditions and children's health, but are not necessarily trending linearly. Specifically, we control for state measures of the number of births in a year, fraction of the population in a given education group in a year (highschool dropout, high school, some college, and college educated), and the fraction of the population in a given race group in a year (white, black, other). Our standard error estimates are clustered at the state level, to account for the fact that the error term may be correlated across time periods within each state.

III.B. Shift Share

Though unemployment rates are commonly used as an indicator of local economic conditions in studies of the effects of business cycles on individual and family outcomes, their use is potentially problematic in this setting. In particular, because the denominator of the unemployment rate measures active labor force participation, unemployment rates are likely to capture changes in labor supply as well as changes in labor demand. This increases the likelihood that changes in unemployment will be correlated with changes in other unobserved variables that may also be related to child outcomes. There also may be a direct reverse-causality bias. If exogenous declines in children's health cause a decline in parent's labor force attachment, the denominator of the unemployment rate will decline and, if total employment remains fixed, the measured unemployment rate will increase. As a result, OLS coefficients may be biased downward. Another potential source of bias is measurement error: unemployment rates are a noisy measure of actual labor market opportunities. This is especially true in an economic downturn; because “discouraged workers" (workers who want to be employed but are no longer actively searching for a job) are not counted in measured unemployment rates, the unemployment rate may not be capturing the full extent of the contraction.

As an alternative to unemployment rates, we capture shocks to labor demand by creating an index of predicted employment growth. The approach is based on the shift-share model developed by Bartik (1991), Katz and Murphy (1992), and Blanchard and Katz (1992). We create a predicted employment growth rate by weighting the national industry-specific employment growth rates by industry shares in each state in a base period and then summing over industries within each state-year as follows:

$$D_{st} = \sum_i G_{it} * \frac{E_{is0}}{E_{s0}} \qquad (3)$$

where G_{it} is the growth rate of industry *i* in year *t* from the March CPS and $\frac{E_{is0}}{E_{s0}}$ is the ratio of industry *i* employment in state *s* to total employment in state *s* from the 1990 Census. Because variation over time in this index is driven by national employment growth rates, it will be uncorrelated with state-level supply shocks, as long as there is no industry for which employment is concentrated in a single state (Blanchard and Katz, 1992). In order to ensure that this is true, while maintaining cross-sectional variation in the base-period industry composition, we use data from seventeen industry categories.[8] Cross sectional variation in state employment

[8] The 17 industry categories are: (1) agriculture, forestry and fishing (2) mining (3) construction (4) low tech manufacturing (lumber, furniture, stone, clay, glass, food, textiles, apparel and leather (5) basic manufacturing (primary metals, fabricated metals, machinery, electrical equipment, automobile, other transport equipment (excluding aircraft), tobacco, paper, printing, rubber, and miscellaneous manufacturing) (6) high tech manufacturing (aircraft, instruments, chemicals, petroleum) (7) transportation (8) telecommunications (9) utilities (10) wholesale

shares also helps identify the effect of demand shocks, since aggregate demand shocks in a particular industry will have larger employment effects in states where the affected industry makes up a relatively greater share of total employment.

We take a similar approach to our estimation of equation (2) by creating analogous shift share indices that reflect gender specific labor demand conditions. Specifically, rather than weighting national industry employment growth rates by the base-period share of *total* state employment in each industry, we weight by the base period share of males or females employed in a given state in each industry, summing across industries, by gender, within the state as follows:

$$D_{stg} = \sum_i G_{it} * \frac{E_{isg0}}{E_{sg0}} \qquad (4)$$

where g indexes the group (male, female). These indices can be interpreted as gender-specific predicted employment growth rates. We include the male and the female index in the same regression so that the coefficient on the male index can be interpreted as the effect of a one percentage-point increase in the predicted employment growth rate for males, holding predicted female employment growth constant, and vice versa.

V. Results

V.A. Effects of General Labor Market Conditions on Children's Health

We begin by estimating the relationship between aggregate employment conditions and children's health outcomes. Our estimates are shown in Tables 2 and 3, and provide little evidence that contemporaneous labor market measures affect children's health. Table 2 follows

trade (11) retail trade (12) finance, insurance, and real estate (13) business and repair services (14) personal services (15) entertainment and recreation services (16) professional and related services (17) public administration. The division of manufacturing into low-tech and high-tech categories follows Katz and Murphy (1992).

the existing literature and focuses on the unemployment rate as the regressor of interest. The first row of Table 2 displays the association between the probability of being in "excellent health" and the unemployment rate. We see that although most of the point estimates suggest that labor market contractions are negatively associated with children's health outcomes, they are never statistically different from zero, regardless of our choice of state, year, and age controls. Adding state linear time trends produces a small decrease in the estimated coefficients, from -0.2 to -0.5, and an increase in the magnitude of the standard error estimates. Nevertheless, the 95 percent confidence intervals allow us to say that a one percentage point increase in the unemployment rate causes at most a 1.6 percent decline in excellent health, and an increase of no more than 0.8 percent. To put these estimates in context, Dehejia and Lleras Muney (2004) estimate that a one percentage point increase in the unemployment rate at the time of conception is associated with a 0.26-0.5 percent reduction in the probability of being classified as low birthweight, and, among black infants, a 3.6-4.8 percent reduction in the probability of having a congenital defect.

The remaining rows of Tables 2 display the results for the other child health outcomes, which follow a similar pattern: taken at face value, most of the point estimates suggest that when labor market conditions worsen, children's health also declines, but nearly all of them are statistically indistinguishable from zero. In general, the estimates are stable across specifications, although the addition of state specific linear trends leads to small jumps in the coefficient estimates and larger standard error estimates. In the first columns of row 5, we do see that a percentage point increase in the unemployment rate increases injuries by 0.14 injuries per 100 children; however, these results are not robust to including trends.

Table 3 shows what happens when we replace the unemployment rate with an exogenous index of predicted employment growth. Employing this measure allows us to isolate the impact of changes in the demand side of the labor market, and sometimes produces point estimates that are opposite in sign from the estimates in Table 3. Nevertheless, similar to Table 2, none of the results are statistically different from zero.

Taken as a whole, we find no consistent evidence that children's health outcomes are either positively or negatively associated with aggregate labor demand conditions, regardless of outcome, specification, or employment measure.[9] We have also estimated our equations by subgroups defined by child age and maternal education and find no evidence that our estimates for the sample as a whole are masking a substantive relationship that exists for a particular demographic group. The difference between our results and those of Dehejia and Lleras Muney (2004) could be due to the fact that we focus on different measures of children's health, or that our health measures are parent-reported rather than administrative; however, analyses of similar self-reported health outcomes among adults find that many of those outcomes do exhibit the same pro-cyclical tendency that has been observed in infant and adult mortality rates. For example, Ruhm (2003) finds pro-cyclical increases in adults having "bed days," while Ruhm (2005) finds that increases in the unemployment rate leads to increases in physical inactivity among adults. Another possible explanation is that, relative to Dehejia and Lleras Muney, our analyses are based on a more recent set of years. Recent studies find that the relationship between labor market conditions and health is weakening (Ruhm, 2014; Stevens et. al, forthcoming). Dehejia and Lleras Muney's analyses are based on Vital Statistics data from 1976-1999, while we only have access to NHIS data between 1997 and 2012.

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[9] We also run our models using the state's employment to population ratio as an alternate measure of aggregate labor market conditions. Our results generally follow the same pattern (with the opposite sign) that we get when we use the unemployment rate.

V.B. Effects of Gender Specific Labor Market Conditions on Children's Health

The weak overall effects shown in Tables 2 and 3 may mask very different relationships between children's health and contemporaneous male and female labor market opportunities. Male and female labor market conditions potentially have different influences on child health. At the same time, aggregate measures of labor market conditions average effects across all demographic groups, and if there are conflicting effects this could result in a null mean impact. More specifically, aggregate measures may potentially mask important and conflicting differences between gender specific labor market conditions.

We examine this possibility in Table 4, which shows the estimated coefficients on the gender specific predicted employment growth rates in equation (2). The pattern of the estimates is striking, and notably similar across health outcomes: positive labor demand shocks for males are associated with improvements in children's health, while positive labor demand shocks for females are associated with declines in those same outcomes. The contrast between the estimated coefficients on the male and female indices is repeated across all specifications and health outcomes, and in many cases, the negative effect of female employment opportunities is substantively larger than the positive effect of the male employment growth index. To give a sense of magnitudes: a one percentage point increase in predicted employment growth is associated with a one percentage point increase in the probability that a child is in excellent health (an increase of approximately 2 percent). Similarly, a one percentage point increase in the male index leads to a 0.5 percentage point reduction in the probability that a child has had an asthma attack in the last 12 months (a reduction of 10 percent relative to the mean). In contrast, a comparable improvement in women's employment opportunities is associated with a more than

4 percent reduction in a child's probability of being in excellent health and a 13 percent increase in the probability of having an asthma attack.

Mechanisms

Our results echo those of recent studies that document differential impacts of maternal and paternal job loss on children's health and achievement (Schaller and Zerpa, 2014; Liu and Zao, 2011; Kalil and Ziol-Guest, 2011). Our analyses differ from the previous research, however, because we focus on the impact of aggregate demand conditions, rather than individual job loss. As described in Section II, there are a number of reasons that the impacts of parental job loss may differ from the impacts of community-level employment opportunities. For example, some researchers have argued that because pollution moves counter-cyclically, it might contribute to the pro-cyclical variation in mortality. Our estimates are not consistent with pollution playing an important role, however, as men are more likely than women to be employed in industries that produce high levels of pollution. Male employment opportunities are associated with improvements in children's health outcomes – which is the opposite of what we would expect if pollution were the leading mechanism. Similarly, it is unlikely that the estimates reflect variation in the provision of social services or availability of public care over the business cycle, as such variation would be tied to variation in tax revenues and should produce positive coefficients on both the male and female employment indices.

Our estimates do line up well with several well-known empirical facts. First, in most married couple households, husbands work more hours than wives, are more likely to be employed full time, and have higher wages.[10] This suggests that compared to changes in women's labor market

[10] Recently Bertrand (forthcoming) documents that from 2008-2011, wives earn more than their husbands in only 27% of households.

opportunities, improvements in men's opportunities should have a larger effect on family income. To the extent that income is a positive input to children's health, improvements in men's employment opportunities should therefore have a relatively larger positive effect on children's health.

At the same time, it is well known that employed women spend more time in housework and child-care than employed men, even conditional on hours of paid work (e.g. Hartman et. al., 2010). For example, among married parents who are full time workers, 71% of mothers spend some time caring for their children, whereas only 54% of fathers do so (BLS, 2008). Among parents who have recently become unemployed, mothers are more likely than fathers to re-allocate their time to parenting tasks (Aguiar, 2013; Paille and Solaz, 2008). This suggests that if parental care is an important contributor to children's health, improvements in female labor market opportunities will have a relatively greater (negative) impact on children's health.

Finally, we do not think that the estimates are driven by changes in insurance coverage, as most studies find that, for children, this varies little over the business cycle (see, for example, Cawley et al. 2013). Moreover, when we estimate equation (2) using measures of insurance coverage as a dependent variable, the estimated coefficients on the male and female employment indices are not statistically different from zero and follow no discernible pattern.

When we stratify on marital status in Table 5, we find that for excellent health and asthma attacks the impact of male employment growth is greater for the children of married mothers, whereas the impact of female employment growth is largely the same for all children, regardless of their parents' marital status. For the remaining outcomes, there is less statistical power when stratifying on marital status making it unclear if these outcomes follow the same pattern. We distinctly see that the negative impact of female labor market opportunities on emotional difficulties is focused on the children of unmarried mothers, which is consistent with children in these families being more vulnerable.

In table 6 we stratify by child age groups (0 to 4, 5 to 9, 10-14, and 15-17). For some outcomes (excellent health, activity limitations, and sick days from school), we find evidence that the health of younger children is more sensitive to economic conditions, which is consistent with emerging evidence that early childhood is a particularly vulnerable period. Particularly when looking at the "sick days from school" outcome, the negative health effect of maternal labor market conditions is strongest for (but not limited to) younger children. This is striking because mothers who work are more likely to send young children to school even when those children are sick, biasing this coefficient downward in magnitude. These findings may also reflect the fact that young children spend more time at home with their parents and are more sensitive to changes in home environment. For example, when a mother works more, younger children are more likely to spend time in daycare, which could lead to greater exposure to infectious diseases (Schaller and Zerpa 2014, Baker et al., 2008).

VI. Conclusions

This paper examines the link between labor market conditions and children's health. An extensive literature documents that adult health declines when labor market opportunities improve, but we know very little about the extent to which this relationship translates to children's health outcomes. Economic theory does not provide clear predictions about the sign of the relationship. Moreover, existing research hints that changes in labor demand may affect the production of children's health very differently for mothers and fathers.

We are among the first to examine the relationship between cyclical changes in labor market opportunities and children's health, and the first to address the potential endogeneity that is inherent in related empirical analyses that rely on common measures of employment opportunities, such as the unemployment rate. We do this by developing a "shift-share" index that exploits state specific industry employment shares in a base period together with national, industry-specific, employment growth. We then take this approach to analyses of labor demand conditions and gender-specific influences on children's health.

Unlike most studies of adult health, we find no systematic evidence that general labor demand conditions correlate with contemporaneous measures of children's health outcomes. This empirical result also contrasts with previous studies that have documented a positive correlation between the unemployment rate and infant mortality. It is robust to a variety of measures of child health, and to a variety of alternative specifications.

We also find consistent evidence that focusing on a broad measure of employment opportunities masks important underlying relationships, however. Specifically, improvements in men's labor market conditions are consistently correlated with improvements in children's health, while improvements in women's labor market opportunities have negative effects that are of similar or larger magnitude. One possible interpretation of these patterns is that mothers and fathers typically provide different inputs into the production children's health, with mothers making relatively larger time investments and fathers providing higher levels of monetary support. Future versions of this paper will investigate this hypothesis in more depth.

References

Aguiar, Mark, Erik Hurst, and Loukas Karabarbounis, 2013. "Time Use during the Great Recession." *American Economic Review* 103(5): 1664–96.

Almond, Douglas, Currie, Janet, 2011. “Human Capital Development before Age Five,” In *Handbook of Labor Economics*, Vol. 4B, edited by Orley Ashenfelter and David E. Card, 1315–1486. Amsterdam: Elsevier.

Almond, Douglas, Lena Edlund, and Mårten Palme, 2009. “Chernobyl's Subclinical Legacy: Prenatal Exposure to Radioactive Fallout and School Outcomes in Sweden.” *The Quarterly Journal of Economics* 124 (4): 1729-1772

Ananat, Elizabeth, Anna Gassman-Pines, and Christina Gibson-Davis, 2011. “The Effects of Local Employment Losses on Children’s Educational Achievement.” edited by G. Duncan and R. Murnane, 299–314. Whither Opportunity. Russel Sage Foundation.

Anderson, Patricia M., Kristin F. Butcher,and Phillip B. Levine, 2003. “Maternal employment and overweight children,” *Journal of Health Economics*, 22(3): 477-504

Baker, Michael, Jonathan Gruber, and Kevin Milligan. "Universal Child Care, Maternal Labor Supply, and Family Well-Being." *Journal of Political Economy* 116.4 (2008): 709-745

Bartik, Timothy J., 1991. *Who Benefits from State and Local Economic Development Policies?* W.E. Upjohn Institute for Employment Research.

Bitler, Marianne P., Jonah B. Gelbach, and Hilary W. Hoynes. 2006. "What Mean Impacts Miss: Distributional Effects of Welfare Reform Experiments." *American Economic Review*, 96(4): 988-1012

Blanchard, Olivier Jean, Lawrence F. Katz, 1992. “Regional Evolutions.” *Brookings Papers on Economic Activity* 1992(1): 1–75.

Blanchflower, David G. and Andrew J. Oswald, 2004. “Well-being over time in Britain and the USA.” Journal of Public Economics, 88(7-8): 1359-1386.

Brand, Jennie E., Becca R. Levy, and William T. Gallo, 2008. “Effects of Layoffs and Plant Closings on Subsequent Depression Among Older Workers.” *Research on Aging*, 30(6):701-721.

Browning, Martin and Eskil Heinesen, 2012. “Effect of job loss due to plant closure on mortality and hospitalization,” *Journal of Health Economics*, 31(4): 599-616.

Bryant, W. Keith and Cathleen D. Zick. 1993. “Trends in time spent caring for children: 1924:31 vs. 1981. *Proceedings of the American Statistical Association’s 1993 Winter Conference,* 401-409.

Case, Anne, Darren Lubotsky, and Christina Paxson. 2002. “Economic Status and Health in Childhood: The Origins of the Gradient.” American Economic Review, 92(5): 1308-1334.

Cawley, John, and Feng Liu, 2012. “Maternal Employment and Childhood Obesity: A Search for Mechanisms in Time Use Data.” *Economics & Human Biology*, Obesity and the Family across the Life Course, 10(4): 352–64.

Cawley, John, Asako S. Moriya, and Kosali Simon, 2013. "The Impact of the Macroeconomy on Health Insurance Coverage: Evidence from the Great Recession." *Health Economics*.

Chay, Kenneth, Michael Greenstone, 2003. “The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession.” *The Quarterly Journal of Economics*, 118(3): 1121-67.

Conger, Rand D., Xiaojia Ge, Glen H. Elder, Frederick O. Lorenz, and Ronald L. Simons, 1994. “Economic stress, coercive family process, and developmental problems of adolescents.” *Child Development*, 65(2): 541–561.

Conger, Rand D. and Kathrine J. Conger, 2007. Understanding the processes through which economic hardship influences families and children. In R. Crane and E. Marshall (Eds.),

Handbook of Families and Poverty: Interdisciplinary Perspectives, 64-81.
Currie, Janet and Matthew Neidell, 2005. “Air Pollution and Infant Health: What Can We Learn from California's Recent Experience?” *The Quarterly Journal of Economics*, 120(3): 1003-1030.
Currie, Janet and Matthew Neidell and Johannes Schmieder, 2009. “Air Pollution and Infant Health: Lessons from New Jersey.” *Journal of Health Economics*, 28(3): 688–703.
Currie, Janet, and Johannes F. Schmieder, 2009. “Fetal Exposures to Toxic Releases and Infant Health.” *American Economic Review*, 99(2): 177-83.
Currie, Janet, and Reed Walker. 2011. “Traffic Congestion and Infant Health: Evidence from E-ZPass.” *American Economic Journal: Applied Economics*, 3(1): 65-90.
Dehejia, Rajeev, and Adriana Lleras-Muney, 2004. “Booms, Busts, and Babies’ Health.” *The Quarterly Journal of Economics* 119(3): 1091–1130.
Dooley David and Ralph Catalano, 1984. “The epidemiology of economic stress.” *American Journal of Community Psychology*. 12(4): 387–409
Dooley, David, Ralph Catalano and Karen S. Rook, 1988. “Personal and Aggregate Unemployment and Psychological Symptoms.” *Journal of Social Issues*. 44(4): 107–123.
Evans, Williams and John D. Graham, 1988. “Traffic safety and the business cycle.” *Alcohol, Drugs, and Driving*, 4(1): 31–38.
Fenwick, Rudy and Mark Tausig, 1994. “The Macroeconomic Context of Job Stress.”*Journal of Health and Social Behavior*, 35(3): 266-282.
Fairbrother Gerry L., Adam C. Carle, Amy Cassedy and Paul W. Newacheck, 2010. “The Impact Of Parental Job Loss On Children's Health Insurance Coverage.” *Health Affairs* 29(7):1343-1349.
Freeman, Richard B., 1999. “The economics of crime.” In *Handbook of Labor Economics*, Vol. 3C, edited by Orley Ashenfelter and David E. Card, 3529-3571. Amsterdam: Elsevier.
Gennetian, Lisa A., Heather D. Hill, Andrew S. London, and Leonard M. Lopoo, 2010. “Maternal Employment and the Health of Low-Income Young Children.” *Journal of Health Economics* 29(3): 353–63.
Gruber, Jonathan and Michael Frakes, 2006. “Does falling smoking lead to rising obesity?” *Journal of Health Economics*, 25(2): 183–197.
Guryan, Jonathan, Erik Hurst, and Melissa Kearney. 2008. "Parental Education and Parental Time with Children." *Journal of Economic Perspectives*, 22(3): 23-46.
Hoynes, Hilary W., Douglas L. Miller, and David Simon, 2012. *Income, the Earned Income Tax Credit, and Infant Health*. Working Paper no. 18206. National Bureau of Economic Research.
Hoynes, Hilary W., Diane Whitmore Schanzenbach, and Douglas Almond, 2012. *Long Run Impacts of Childhood Access to the Safety Net*. Working Paper no. 18535. National Bureau of Economic Research.
Institute of Medicine (US), 2000. Committee on the Assessment of Asthma and Indoor Air. *Clearing the air: asthma and indoor air exposures*. National Academy Press.
Kalil, Ariel, 2009. "Joblessness, family relations and children's development." *Family Matters* 83: 15.
———, 2013. “Effects of the Great Recession on Child Development.” *The ANNALS of the American Academy of Political and Social Science* 650(1): 232–50.
Kalil, Ariel, and K. Ziol-Guest, 2013 “The Great Recession and married parents’ use of time.” mimeo.

Katz, Lawrence F, and Kevin M Murphy, 1992. "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *The Quarterly Journal of Economics* 107(1): 35–78.
Knittel, Christopher R., Douglas L. Miller, Nicholas J. Sanders, 2011. *Caution, Drivers! Children Present: Traffic, Pollution, and Infant Health* Working Paper no. 17222. National Bureau of Economic Research.
Leininger, Lindsey Jeanne, and Ariel Kalil, 2014. "Economic Strain and Children's Behavior in the Aftermath of the Great Recession." *Journal of Marriage and Family* 76(5): 998–1010.
Lindeboom, Maarten, France Portrait, and Gerard J. van den Berg, 2010. "Long-Run Effects on Longevity of a Nutritional Shock Early in Life: The Dutch Potato Famine of 1846–1847." *Journal of Health Economics* 29(5): 617–29.
Lindo, Jason M., 2015. "Aggregation and The Estimated Effects of Local Economic Conditions on Health." *Journal of Health Economics*, 40:83-96.
———, 2011. "Parental Job Loss and Infant Health." *Journal of Health Economics* 30(5): 869–79.
Liu, Echu, Cheng Hsiao, Tomoya Matsumoto, and Shinyi Chou, 2009. "Maternal Full-Time Employment and Overweight Children: Parametric, Semi-Parametric, and Non-Parametric Assessment." *Journal of Econometrics* 152(1): 61–69.
Liu, Hong and Zhao, Zhong, 2014. "Parental job loss and children's health: Ten years after the massive layoff of the SOEs' workers in China." *China Economic Review*, 31(C): 303-319.
Morrill, Melinda S., 2011. "The effects of maternal employment on the health of school-age children." *Journal of Health Economics*, 30 (2): 240-257.
Morrill, Melinda S. and Pabilonia, Sabrina W., 2015 "What effects do macroeconomic conditions have on the time couples with children spend together?" *Review of Economics of the Household*, 1-24.
Pailhé, Ariane and Anne Solaz, 2012. "The influence of employment uncertainty on childbearing in France: A tempo or quantum effect?" Demographic Research, 26(1): 1-40.
Pleck, Joseph H., 1997. Paternal involvement: Levels, sources, and consequences. In *The role of the father in child development*, Vol. 14 (3rd edition), edited by M. E. Lamb. 14: 66-103. New York: John Wiley & Sons.
Reyes, Jessica W., 2007. "Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime," *The B.E. Journal of Economic Analysis & Policy*, 7(1): 1935-1682.
Ruhm, Christopher J., 2000a. "Parental Leave and Child Health." *Journal of Health Economics* 19(6): 931–60.
———, 2000b. "Are Recessions Good For Your Health?" *The Quarterly Journal of Economics*, 115(2): 617-650.
———, 2003. "Good Times Make You Sick." *Journal of Health Economics* 22(4): 637–58.
———, 2005a. "Mortality Increases During Economic Upturns." *International Journal of Epidemiology*, 34(6): 1206-1211.
———, 2005b. "Healthy Living in Hard Times." *Journal of Health Economics* 24(2): 341–63.
Ruhm, Christopher and William E. Black, 2002. "Does Drinking Really Decrease in Bad Times?" *Journal of Health Economics*, 21(4): 659-678.
Sabia, Joseph J, 2008. "Every Breath You Take: The Effect of Postpartum Maternal Smoking On Childhood Asthma." *Southern Economic Journal*, 75(1): 128-158.
Shankardass, Ketan, Rob McConnell, Michael Jerrett, Joel Milam, Jean Richardson, and Kiros

Berhane, 2009. “Parental stress increases the effect of traffic-related air pollution on childhood asthma incidence.” *PNAS* 106 (30) 12406-12411.

Sanders, Nicholas J., 2012. “What Doesn’t Kill You Makes You Weaker: Prenatal Pollution Exposure and Educational Outcomes.” *Journal of Human Resources*, 47(3): 826-850.

Schaller, Jessamyn. “Booms, Busts, and Fertility: Testing the Becker Model Using Gender-Specific Labor Demand.” *Journal of Human Resources*, forthcoming.

Schaller, Jessamyn, and Mariana Zerpa, 2014. *Economic Conditions, Parental Job Loss, and Child Health*. Mimeo. University of Arizona.

Schaller, Jessamyn, and Ann H. Stevens, 2014. *Short-Run Effects of Job Loss on Health Conditions, Health Insurance, and Health Care Utilization*. Working Paper no. 19884. National Bureau of Economic Research.

Shah, Anuj K., Sendhil Mullainathan, and Eldar Shafir, 2012. “Some Consequences of Having Too Little.” *Science* 338(6107): 682–85.

Simon, David, 2013. *Does Early Life Exposure to Cigarette Smoke Permanently Harm Childhood Health? Evidence from Cigarette Tax Hikes*. Working papers. University of Connecticut, Department of Economics.

Soni, Anita. “STATISTICAL BRIEF #434: The Five Most Costly Children’s Conditions, 2011: Estimates for U.S. Civilian Noninstitutionalized Children, Ages 0-17.” *Agency for Healthcare Research and Quality*. Accessed May 19, 2015. http://meps.ahrq.gov/data_files/publications/st434/stat434.shtml.

Stevens, Ann Huff, and Jessamyn Schaller, 2011. “Short-Run Effects of Parental Job Loss on Children’s Academic Achievement.” *Economics of Education Review* 30(2): 289–99.

Stevens, Ann Huff, Douglas L. Miller, Marianne E. Page, and Mateusz Filipski, *forthcoming*. *The Best of Times, the Worst of Times: Understanding Pro-Cyclical Mortality*. Working Paper no. 17657. National Bureau of Economic Research.

van den Berg, Gerard J, Gabriele Doblhammer, and Kaare Christensen, 2009. “Exogenous Determinants of Early-Life Conditions, and Mortality Later in Life.” *Social Science & Medicine* 68(9): 1591–98.

van den Berg, Gerard J., Maarten Lindeboom, and France Portrait, 2006. “Economic Conditions Early in Life and Individual Mortality.” *The American Economic Review* 96(1): 290–302.

Table 1. Summary Statistics

Variable	Mean	Observations	Dataset
Outcomes			
Excellent health	54.96	410009	Person file
	(49.75)		
Activitiy limiting conditions	7.36	410985	Person file
	(26.11)		
Number of injuries	2.19	410981	Person file
	(14.63)		
Child asthma (past 12 months)	5.47	194009	Child file
	(22.75)		
Sick days from school	3.52	134197	Child file
	(6.55)		
Severe emotional difficulties	1.21	130690	Child file
	(10.93)		
Demographic			
Child Age	8.53	194056	Child file
	(5.18)		
% Mothers HS dropout	0.16	361959	Person file
	(0.36)		
% Mothers HS grad	0.26	361959	Person file
	(0.44)		
% Mothers some college	0.56	361959	Person file
	(0.50)		
% Unmarried	0.26	368515	Person file
	(0.44)		
Economic Conditions			
Unemployment rate	5.60	410985	Person File
	(2.07)		
Female labor demand index	0.97	410985	Person File
	(1.46)		
Male labor demand index	0.39	410985	Person File
	(2.16)		
Total index	0.74	410985	Person File
	(1.72)		

Table 2: The impact of the Unemployment Rate on Child Health

Outcome	Model 1	Model 2	Model 3	Model 4
Excellent health	-0.21	-0.30	-0.58	-0.56
	(0.31)	(0.30)	(0.51)	(0.53)
Mean Dependent Variable		*55.79*		
Number of Cells		*14323*		
Asthma Attack in 12 months	0.09	0.12	0.01	-0.01
	(0.12)	(0.11)	(0.15)	(0.15)
Mean Dependent Variable		*5.54*		
Number of Cells		*13754*		
Activity limiting condition	0.00	-0.07	-0.1	-0.1
	(0.08)	(0.08)	(0.11)	(0.11)
Mean Dependent Variable		*7.96*		
Number of Cells		*14323*		
Number of injuries	0.14***	0.11***	0.07	0.06
	(0.04)	(0.04)	(0.05)	(0.05)
Mean Dependent Variable		*2.40*		
Number of Cells		*14323*		
Severe emotional difficulties	0.08	0.08	0.12	0.11
	(0.05)	(0.06)	(0.08)	(0.08)
Mean Dependent Variable		*1.19*		
Number of Cells		*7986*		
Sick days from school	0.01	0.02	0.02	0.02
	(0.03)	(0.03)	(0.04)	(0.04)
Mean Dependent Variable		*3.65*		
Number of Cells		*9920*		
State and Age-Year FE	Yes	Yes	Yes	Yes
State-Year Controls	No	Yes	Yes	Yes
State Trends	No	No	Yes	Yes
State-Age and Age-Year FE	No	No	No	Yes

Table 3: Reduced Form Estimates of the Impact of the Shift-Share

Outcome	Model 1	Model 2	Model 3	Model 4
Excellent health	-0.5	-0.47	-0.44	-0.45
	(0.32)	(0.33)	(0.45)	(0.47)
Mean Dependent Variable	*55.80*			
Number of Cells	*14322*			
Asthma Attack in 12 months	-0.05	-0.1	-0.12	-0.11
	(0.13)	(0.13)	(0.18)	(0.19)
Mean Dependent Variable	*5.54*			
Number of Cells	*13754*			
Activity limiting condition	-0.08	-0.04	0.09	0.1
	(0.13)	(0.13)	(0.13)	(0.14)
Mean Dependent Variable	*7.96*			
Number of Cells	*14323*			
Injured in past 12 months	-0.1	-0.08	-0.07	-0.06
	(0.08)	(0.08)	(0.07)	(0.07)
Mean Dependent Variable	*2.29*			
Number of Cells	*14323*			
Severe emotional difficulties	0.06	0.04	0.06	0.06
	(0.07)	(0.07)	(0.08)	(0.09)
Mean Dependent Variable	*1.19*			
Number of Cells	*7986*			
Sick days from school	-0.05	-0.06	-0.1	-0.09
	(0.05)	(0.05)	(0.09)	(0.09)
Mean Dependent Variable	*3.65*			
Number of Cells	*9920*			
State and Age-Year FE	Yes	Yes	Yes	Yes
State-Year Controls	No	Yes	Yes	Yes
State Trends	No	No	Yes	Yes
State-Age and Age-Year FE	No	No	No	Yes

Table 4: The Impact of Gender Specific Indicies on Child Health

	Male				Female			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Excellent health	1.05**	1.1**	1.26**	1.26**	-2.31***	-2.35***	-2.55***	-2.56***
	(0.52)	(0.54)	(0.61)	(0.63)	(0.72)	(0.76)	(0.84)	(0.86)
Mean Dependent Variable				*55.80*				
Number of Cells				*14322*				
Asthma Attack in 12 months	-0.53**	-0.53**	-0.57***	-0.57**	0.76**	0.7*	0.72*	0.73*
	(0.22)	(0.22)	(0.22)	(0.23)	(0.36)	(0.37)	(0.38)	(0.39)
Mean Dependent Variable				*5.54*				
Number of Cells				*13754*				
Activity limiting condition	-0.3*	-0.27	-0.24	-0.23	0.38	0.37	0.49**	0.48**
	(0.18)	(0.18)	(0.17)	(0.16)	(0.23)	(0.24)	(0.24)	(0.24)
Mean Dependent Variable				*7.96*				
Number of Cells				*14323*				
Number of injuries	-0.13	-0.1	-0.04	-0.04	0.02	0.01	-0.07	-0.07
	(0.1)	(0.11)	(0.12)	(0.13)	(0.13)	(0.14)	(0.15)	(0.15)
Mean Dependent Variable				*2.40*				
Number of Cells				*14323*				
Severe emotional difficulties	-0.19*	-0.17	-0.17	-0.16	0.37**	0.32*	0.34*	0.32
	(0.1)	(0.11)	(0.15)	(0.15)	(0.15)	(0.16)	(0.2)	(0.21)
Mean Dependent Variable				*1.19*				
Number of Cells				*7986*				
Sick days from school	-0.16	-0.16	-0.2*	-0.2	0.18	0.17	0.18	0.18
	(0.11)	(0.11)	(0.12)	(0.13)	(0.17)	(0.18)	(0.19)	(0.2)
Mean Dependent Variable				*3.65*				
Number of Cells				*9920*				
State and Age-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
State Trends	No	No	Yes	Yes	No	No	Yes	Yes
State-Age and Age-Year FE	No	No	No	Yes	No	No	No	Yes

Table 5: The Impact of Gender Specific Indicies on Child Health

	Excellent Health		Asthma attack		Activity Limiting Condition		Number of injuries		Severe Emotional Difficulties		Sick Days from School	
						Married						
Male	1.22**	1.17*	-0.61***	-0.64***	-0.13	-0.03	0.01	0.06	0.04	0.06	-0.11	-0.2
	(0.57)	(0.57)	(0.22)	(0.22)	(0.19)	(0.19)	(0.12)	(0.15)	(0.13)	(0.16)	(0.10)	(0.11)
Female	-2.54***	-2.48***	0.64*	0.73*	0.22	0.32	-0.21	-0.33	0.01	0.04	0.14	0.14
	(0.80)	(0.85)	(0.39)	(0.39)	(0.27)	(0.31)	(0.19)	(0.20)	(0.17)	(0.19)	(0.16)	(0.16)
Mean Dependent Variable	*54.37*		*4.73*		*6.36*		*1.93*		*0.87*		*3.27*	
Number of Cells	*92092*		*61056*		*92364*		*92364*		*34188*		*43043*	
						Not Married						
Male	0.93	0.72	-0.21	-0.12	-0.35	-0.3	-0.43	-0.31	-0.6**	-0.49	-0.33	-0.22
	(0.83)	(0.92)	(0.53)	(0.48)	(0.51)	(0.55)	(0.20)	(0.22)	(0.29)	(0.32)	(0.25)	(0.30)
Female	-2.27*	-2.72**	0.58	0.42	0.59	0.7	0.38	0.34	0.82**	0.82*	0.19	0.2
	(1.19)	(1.31)	(0.39)	(0.84)	(0.70)	(0.74)	(0.31)	(0.30)	(0.40)	(0.43)	(0.36)	(0.42)
Mean Dependent Variable	*45.57*		*7.63*		*9.67*		*2.08*		*2.04*		*4.3*	
Number of Cells	*63771*		*61056*		*63909*		*63909*		*21942*		*26872*	
State-Year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Table 6: The Impact of Gender Specific Indicies on Child Health

	Excellent Health		Asthma attack		Activity Limiting Condition		Number of injuries		Severe Emotional Difficulties		Sick Days from School	
						Ages 0-4						
Male	1.74*	1.84*	-0.5	-0.47	-0.74***	-0.64**	-0.11	-0.07	-0.02	-0.31		
	(0.93)	(0.98)	(0.35)	(0.37)	(0.27)	(0.26)	(0.17)	(0.21)	(0.32)	(0.52)		
Female	-2.52**	-2.85**	0.78	0.8	0.91**	0.87**	-0.11	-0.14	0.17	-0.05		
	(1.26)	(1.3)	(0.69)	(0.69)	(0.45)	(0.44)	(0.3)	(0.33)	(0.65)	(1.08)		
Mean Dependent Variable	*54.41*		*4.53*		*4.33*		*1.43*		*0.60*			
Number of Cells	*43668*		*29329*		*43787*		*43787*		*4034*			
						Ages 5-9						
Male	1.35	1.57	0.01	0.15	0.11	-0.13	-0.00	-0.01	0.12	0.14	-0.18	-0.19
	(0.88)	(1.00)	(0.43)	(0.46)	(0.43)	(0.47)	(0.16)	(0.19)	(0.18)	(0.26)	(0.18)	(0.2)
Female	-2.9**	-3.28**	0.62	0.51	0.3	0.7	-0.18	-0.17	0.42	0.42	0.41**	0.41**
	(1.3)	(1.34)	(0.8)	(0.83)	(0.58)	(0.59)	(0.3)	(0.32)	(0.3)	(0.4)	(0.18)	(0.2)
Mean Dependent Variable	*50.97*		*6.81*		*7.96*		*1.66*		*1.20*		*3.35*	
Number of Cells	*43590*		*26640*		*43688*		*43688*		*19364*		*25966*	
						Ages 10-14						
Male	1.15	0.85	-0.22	-0.23	0.3	0.37	-0.11	0.02	-0.15	-0.12	-0.01	0.03
	(0.9)	(1.01)	(0.53)	(0.54)	(0.36)	(0.34)	(0.2)	(0.22)	(0.24)	(0.24)	(0.16)	(0.16)
Female	-2.93**	-2.65*	0.31	0.36	0.15	0.03	-0.46*	-0.62**	0.55	0.55	-0.04	-0.06
	(1.14)	(1.4)	(0.69)	(0.84)	(0.57)	(0.57)	(0.24)	(0.26)	(0.37)	(0.38)	(0.25)	(0.26)
Mean Dependent Variable	*49.16*		*6.54*		*10.04*		*2.33*		*1.44*		*3.56*	
Number of Cells	*43100*		*27136*		*43216*		*43216*		*19853*		*26756*	
						Ages 15-17						
Male	-0.04	-0.2	-1.00	-1.16	-0.16	0.19	-0.34	-0.19	-0.18	0.06	-0.22	-0.36
	(0.81)	(0.8)	(0.61)	(0.71)	(0.34)	(0.38)	(0.3)	(0.35)	(0.2)	(0.25)	(0.24)	(0.25)
Female	-0.76	-0.89	1.32	1.43	0.27	0.03	0.35	0.21	0.3	-0.01	0.21	0.3
	(1.25)	(1.26)	(0.87)	(0.93)	(0.5)	(0.51)	(0.44)	(0.47)	(0.28)	(0.31)	(0.38)	(0.38)
Mean Dependent Variable	*46.90*		*5.64*		*9.12*		*2.92*		*1.56*		*4.31*	
Number of Cells	*25505*		*17537*		*25582*		*25582*		*12879*		*17193*	
State-Year Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Trends	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes