Parental Job Loss and Infant Health

Jason Lindo*
University of Oregon

October 26, 2009

Abstract

While a number of papers have analyzed the effects of job loss on various measures of health, this paper is the first to explore the extent to which the health effects extend to the children of displaced workers. More generally, this research sheds light on the causal link between socioeconomic status and infant health, as job displacements can be thought of as providing a plausibly exogenous shock to income. Specifically, I use detailed work and fertility histories from the Panel Study of Income Dynamics to estimate the impact of parents' job displacements on children's birth weights. These data allow for an identification strategy that essentially compares the outcomes of children born after a displacement to the outcomes of their siblings born before using mother fixed effects. I find that husbands' job losses have significant negative effects on infant health. They reduce birth weights by approximately four percent with the impact is concentrated on the lower half of the birth weight distribution.

JEL Classification: I10, J13, J63

Keywords: children, infant health, job loss, socioeconomic status and health

*I thank Alan Barreca, Colin Cameron, Doug Miller, Marianne Page, Larry Singell, Ann Huff Stevens, and Glen Waddell for helpful comments at various stages of this paper. Contact: Department of Economics, 1285 University of Oregon, Eugene, OR 97403; jlindo@uoregon.edu.

1 Introduction

This work contributes to the growing literature on the impacts of job displacements that, while initially focusing on lost earnings, has more recently demonstrated that there are also important consequences for health.[1] For example, Eliason and Storrie (2009), Sullivan and von Wachter (2009), and Rege, Telle, and Votruba (forthcoming) have found harmful effects on mortality using data from Sweden, Pennsylvania, and Norway, respectively.[2] Researchers have also analyzed the mental health effects of displacement, finding mixed results.[3] Although the health effects have been explored in many different settings, the literature has focused primarily on the effects for displaced workers themselves.[4] This paper is the first to explore the extent to which the health effects extend to the children of displaced workers. Specifically, I estimate the impact of parents' job displacements on birth weights. To deal with the possibility that job displacements might not be exogenous to infant health, I use models with mother fixed effects so that the estimated effects are driven primarily by a comparison of children born after a displacement to their siblings born before.

Although not usually focusing on health, a number of papers have demonstrated that job displacements have important consequences for the entire family. For example, Stephens (2002) shows that women work more following a husbands' job loss to compensate for his lost earnings; Charles and Stephens (2004) show that getting fired increases the probability of divorce; and Lindo (forthcoming) shows that husbands' displacements affect fertility. Perhaps more closely related to this study, Oreopoulos, Page, and Stevens (2008), Page, Stevens, and Lindo (2009), and Stevens and Schaller (2009) have demonstrated that there are important

[1] For examples of the former, see Ruhm (1991), Jacobson, LaLonde, and Sullivan (1993), and Stevens (1997), among many others.

[2] In contrast, Martikainen, Maki, and Jantti (2007) find no effects on mortality using data from Finland.

[3] For example, Browning, Dano, and Heinesen (2006) find no effect with data from Denmark and Kuhn, Lalive, and Zweimueller (2007) find harmful effects with data from Austria.

[4] To my knowledge, the only exception is Salm (2009) who considers also considers the short-run health effects for spouses. Focusing on older workers in the United States, he finds no impacts on either displaced workers themselves or their spouses.

consequences for children who are in the household when a parent is displaced. This paper, however, is the first to consider the impacts on children born following a parent's job loss.

This paper is closely related to Dehejia and Lleras-Muney (2004) who show that birth weights improve during recessions. While they show that both selection into motherhood and improvements in health-related behaviors play a role, like other papers analyzing the health effects of local unemployment rates, the identification strategy cannot disentangle the effects of own job displacements from other aspects of recessions. Recent research suggests that this distinction is crucial. Specifically, Sullivan and von Wachter (2009) find that own job displacements increase mortality for U.S. workers which is in contrast with evidence that mortality improves during recessions (Ruhm 2000).

This paper can also be thought of as providing a window into the relationship between socioeconomic status and health. In general, measures of socioeconomic status are positively related with measures of health. Figure 1 demonstrates that birth weights, the measure of infant health I focus on in this paper, are no exception.[5] Of course, it is difficult to ascertain to what extent differences in socioeconomic status *cause* differences in infant health outcomes because there may be characteristics that lead individuals to have both lower socioeconomic status and to have children with poorer health. As argued in Oreopoulos, Page, and Stevens (2008), Page, Stevens, and Lindo (2009), and Lindo (forthcoming), we can learn about the causal effect of income on various outcomes by considering the effects of job displacements which provide a plausibly exogenous shock to household income after controlling for individual fixed effects. As such, this paper offers insight into the causal link between family income and infant health.[6]

[5]A large literature demonstrates that birth weights are a good proxy for infant health. Almond, Chay, and Lee (2005), Black, Devereux, and Salvanes (2007), and Royer (2009) show that birth weight is associated with important short-run outcomes including infant mortality and hospital costs. Further, Behrman and Rosenzweig (2004), Black, Devereux, and Salvanes (2007), Oreopoulos, Stabile, Walld, and Roos (2008) show that birth weights are associated with a wide variety of important long-term outcomes such as IQ, education, and earnings.

[6]This paper complements Lindahl (2005) who analyzes the health effects of monetary lottery prizes.

Using data from the Panel Study of Income Dynamics which has detailed information on both employment histories and fertility histories, I find that a husband's displacement reduces the birth weight of subsequent children by approximately four percent, or five ounces. Although I do not find a statistically significant effect on the conventional measure of "low birth weight," I find that the impact is concentrated in the bottom half of the birth weight distribution. I further find that the effects are evident for children born immediately following the job loss and those born many years after the job loss, for both male and female children, and for those born to mothers of varying levels of education. While it is possible to conduct a similar analysis of women's job displacements, I show that such an analysis is troublesome because job displacements may proxy for women's labor force participation.

The rest of this paper is organized as follows. Sections 2 and 3 describe the data and empirical strategy. Section 4 presents the results of the empirical analysis while Section 5 discusses the results. Section 6 concludes.

2 Data

This paper uses data from the 1968–1997 waves of the Panel Study of Income Dynamics (PSID) including its Childbirth and Adoption History Supplement (CAHS). The PSID is a longitudinal study that began as a nationally representative sample of households in 1968, with an additional oversample of low-income families. The survey has continued to follow these individuals and their children as they form new households. I use data from each of the original samples (and their split-offs) and use PSID weights. The CAHS includes retrospective fertility histories, with children's year and month of birth, for all individuals of childbearing age surveyed in the PSID in 1985 or later. Most importantly, the data include birth weights in ounces for children born in 1985 and later.[7]

[7]The PSID also has retrospective data on whether or not children born before 1985 were low birth weight. The results shown in this paper do not use this data so that the sample is consistent throughout; however,

My definition of displacement follows Stevens (1997) and others who have used the PSID to study the impacts of job loss. Displacements are identified based on the response to a question asking individuals who are not working, and those who began their current job within the last year, "what happened to your previous job?" Initially, I define an individual as displaced in the previous year if his last job ended due to a plant or business closing or due to being laid off or fired. Since it is not clear from the survey whether the job loss occurs in the current or previous year, I assume that the displacement occurred in the previous year.

Topel (1990) explains that the survey might miss displacements since the survey question focuses on the last job. That is, we might incorrectly categorize an individual as not displaced if he has had and left another job after his displacement and before he is surveyed. Since this concern is likely greater for the years following 1997 when the PSID changed to a biennial format, data following 1997 are not used. To be consistent, after identifying displacements using 1968–1997 data, I limit the analysis sample to 1968–1996 since displacements identified in 1997 are assumed to have occurred in 1996. Another feature of the data that is important to note is that, unlike subsequent years, the 1968 survey only asks those who began working for their current employer in the last ten years their reason for leaving the last job. As a result, those who report a displacement in 1968 are excluded from the sample since the timing of the displacement cannot be ascertained. Finally, while one might experience multiple displacements, I consider the year of the first displacement the "displacement year." This is important because it has been shown that initial displacements predict future displacements and, thus, subsequent displacements should not be considered exogenous (Stevens 1997).

Since the PSID began tracking job changes for heads of households beginning with the 1968 survey and the sample of mothers are those having children in 1985 and later, we can potentially observe work histories for many years before a child's birth. This is important to help ensure that children are not incorrectly classified as "not treated" if a displacement

estimated impacts that make use of this data are very similar to the presented results.

occurred several years prior to a child's birth. Also with this consideration in mind, I restrict the sample to women who married in 1968 or later which removes women who I cannot observe from the beginning of their marriage and I restrict the sample to children who are born while their mother is in the survey. I also limit the sample to children who are born after a mother was first married, because the analysis focuses on an indicator for having had a displaced husband and this variable would necessarily be zero for children born before their mother was first married (just as it would necessarily be zero for a mother that never marries).

3 Empirical Strategy

The analysis is conducted in two parts. First, I use methods taken from the displacement literature to demonstrate the effects of displacements on select labor market outcomes. I then estimate the impacts on infant health.

3.1 Estimating the Impact of Displacements on Labor Market Outcomes

Following Jacobson, LaLonde, and Sullivan (1993) and Stevens (1997), I estimate the impact of job displacements on labor market outcomes using the following regression equation:

$$LaborOutcome_{it} = D_{it}\delta + X_{it}\beta + \alpha_t + \alpha_i + u_{it} \tag{1}$$

where D_{it} is a vector of indicators indicating a displacement in a future, current, or previous year, α_t are year fixed effects, α_i are individual fixed effects, and u_{it} is a random error term. X_{it} can include a variety of time-varying individual variables but is limited to a quadratic in age. In estimating this model, D_{it} includes indicators for 2 years prior to

displacement, 1 year prior to displacement, the year of the displacement, and indicators for subsequent years following a displacement—the omitted category is 3 or more years prior to displacement and never having a husband displaced. Previous studies have shown that it is important to include indicators for years prior to displacement since earnings begin to fall below their expected levels prior to the actual event. The individual fixed effects control for permanent unobservable characteristics that may be related to both husbands' earnings and the probability of displacement. With the individual fixed effects, year fixed effects, and post-displacement indicator variables, this model is a generalized difference-in-difference model. I also estimate versions of this model that include individual trends to allow for the possibility that those who experience displacements have different trajectories in addition to different levels.

3.2 Estimating the Impact of Displacements on Birth Weights

As a starting point, I estimate a simple model that compares the birth weights of children born following a husband's first displacement to children for whom no such event has taken place. The regression equation is given by:

$$y_{sma} = D_{sma}\delta + X_{sma}\beta + \alpha_a + u_{sma} \tag{2}$$

where y_{sma} is a birth outcome for child s of mother m at age a, D_{sma} is an indicator variable equal to one if the child is born in the same year the mother has a displaced husband or any year afterwards, X_{sma} is a vector of covariates, α_a are age fixed effects, and u_{sma} is a random error term. δ is the estimated impact of a husband's displacement.

The estimated impact based on equation (2) will only be valid if husband's displacements are exogenous to birth outcomes. Since husband's displacements are unlikely to be exogenous to birth outcomes, my preferred estimates are based on a model that includes mother fixed

effects to control for fixed characteristics of mothers related to both children's birth weights and the probability of having a displaced husband. The resulting regression equation is as follows:

$$y_{sma} = D_{sma}\delta + X_{sma}\beta + \alpha_a + \alpha_m + u_{sma} \tag{3}$$

where all of the notation is the same as in equation (2) and α_m are mother fixed effects. The estimated effect of a husband's displacement based on this model are identified by the comparison of siblings born before versus those born after a displacement. Mothers who do not ever have a displaced husband, or only have children before or only after a husband's displacement, are included in the analysis to help identify the other parameters.[8] I also estimate models that allow for heterogeneous effects over time (as in the analysis of the impacts on labor market outcomes).

This model is very similar to models that have been used to estimate the impact of displacements on individual's labor market outcomes (equation 1). That is, it is a difference-in-difference model that controls for individual fixed effects and time fixed effects.

An important aspect that distinguishes this analysis from the analysis of labor market outcomes is that post-displacement birth outcomes cannot be measured for all women and, as a result, the effect is identified only based on those who have additional children following a husband's displacement. In one important respect, this is precisely what we want. Specifically, to the extent to which we are interested in the consequences of parents' job losses on children's outcomes, we do not want our estimates to capture how children who *could* have been born (but are not) *would* have been affected. Further, the identification strategy is able to control for selection into motherhood with the inclusion of mother fixed effects. For example, the mother fixed effects would control for the possibility that the types of mothers who have children following a husband's job loss might be the types who tend to give birth

[8] In results available upon request, I have verified that the results are very similar if the sample is restricted to women with multiple children or to just those who have a husband displaced at some point in time.

to low birth weight children. Provided that siblings born prior to a parent's displacement are a good counterfactual for those who are born after a parent's displacement, the estimated effects will be unbiased.

However, the fact that we do not observe post-displacement infant health outcomes for all mothers does make it more difficult to make statements about the relationship between socioeconomic status and infant health. From that perspective, we might be especially concerned that those continuing to have children following a displacement might be those who are the least affected by the displacement.[9] Fortunately, this concern can be addressed with the data. Specifically, I confirm that the displacement-driven income shock is identical when one considers the full sample or when one considers only those women who have children following a displacement.

4 Results

I begin by estimating the effects of job displacements on work activity, demonstrating that women's job displacements may proxy for their labor force participation but that this is not an issue in looking at husband's job displacements. I then demonstrate the impact of husband's job displacements on family income before exploring the effects on infant health.

4.1 Job Displacements, Work, and Income

Table 1 presents the estimated effects of job loss on weeks worked, separately considering the effects of women's and their husbands' job displacements. Following Jacobson, LaLonde, and Sullivan (1993), all of the estimates are based on models that include individual fixed effects, year fixed effects, and a polynomial in age. The key set of regressors are indicator

[9] As such, we might be likely to find no impact on infant health despite the large negative impacts on incomes. It would not be valid to interpret such findings as evidence that income does not have a causal effect on infant health.

variables for being 2 years prior to a job loss, 1 years prior to a job loss, in the year of the job loss, through 5 or more years following a job loss. The omitted category is being 3 years prior to a job loss or never having had a displaced husband. The even columns add individual trends to the model to allow for the possibility that those who experience displacements have different trajectories in addition to different levels.

In columns 1 and 2, the estimated impacts of women's displacements on their weeks worked raise a red flag. In particular, the estimates indicate that women who are displaced work four to six weeks more per year in the years immediately preceding the job loss than we would expect (based on their own histories of weeks worked). This is not necessarily surprising since one has to be working in order to lose one's job. However, it does demonstrate the difficulty of analyzing the consequences of women's job losses. Specifically, it seems that women's job displacements may serve as a proxy for participating in the labor market. As such, any attempt to estimate the consequences of a woman's job loss will have trouble disentangling the effect of the job loss itself from the effects of the events leading her to increase her work activity. As a result, the rest of the paper will focus on the consequences of men's job displacements.

Columns 3 and 4 demonstrate that a similar issue is not present when analyzing husband's job displacements, as there is no evidence that they are more likely to work in the years preceding their job losses. This finding is also probably what we would expect because working age men are strongly attached to the labor market. These estimates also indicate that job displacements reduce men's weeks worked by approximately four weeks per year in the two years following the job loss. However, within a few years their work activity recovers to their expected levels, again pointing towards men's strong attachment to the labor market.

Columns 1 and 2 of Table 2 use the same approach to estimate the effects of a husband's job displacement on family income. The estimates indicate that husbands' job displacements

have large and permanent impacts on income. The coefficient estimate on the indicator for 5 or more years following a husband's displacement implies that a husband's job loss reduces long-run income by 29%.[10]. Overall, these estimates are consistent with the existing literature although the long-run effect is on the high side and, unlike other studies, I find no evidence of recovery. This may be due to the fact that I am focusing on married men (who are relatively young) whereas most other studies have used broader samples.

Another notable feature of the estimates is that incomes begin to fall below their expected levels two years preceding the separation.[11] This could possibly be interpreted as a red flag since it suggests that time-varying unobservable characteristics might be causing the displacements to occur. However, this is a robust finding in the displacement literature, including studies focusing only on plant closures which surely are not driven by the unobservable characteristics of any given worker. Given that many displaced workers initial jobs are in distressed firms, this finding is not surprising. While the displacement literature provides little evidence of the mechanism driving this result, potential explanations include wage stagnation, reduced overtime, and temporary layoffs.

In the results that follow, I will present the estimated effects of husbands' job displacements on birth weights. Before moving on, however, it is important to note again that a limitation of the research design is that birth outcomes are not observed for all women who experience a husband's displacement. If the only women who continue to have children following a husband's displacement are those who suffer the smallest of income shocks, then we would be unlikely to find an effect on birth weights. As such, we might incorrectly conclude that income plays only a small role in determining birth weights since displacements lead to large reductions in incomes but no such reductions in birth weights. On the other hand, if women suffering the most severe income shocks are most likely to continue having

[10]The percentage effect on earnings is computed as $e^{\delta} - 1$.

[11]In results not shown, I have verified that there is no evidence that they begin to fall three years prior to the separation.

children, then we might be tempted to understate the role that income plays in determining birth weights. Fortunately, these potential issues can be explored with the data at hand. Columns 3 and 4 of Table 2 estimate the magnitude of the income shock for women who do have children following a husband's job displacement. Specifically, women who experience a husband's displacement but do not have a child afterwards are not included in the analysis. These estimates are nearly identical to the estimates in columns 1 and 2, demonstrating that the income shock is similar for women having children following a husbands displacement and those who do not.

4.2 Summary Statistics

Table 3 presents summary statistics for the sample of children. The first three columns separate the children into those who are born to a mother who never experiences a husband's displacement, children born before their mother has a displaced husband, and children born following the displacement of a mother's husband.

There are important differences in the characteristics of the mothers who experience a husband's displacement (columns 2 and 3) and those who never experience a husband's displacement (column 1). Those who experience a husband's displacement are less educated and more likely to be black. Similar differences exist between mothers who themselves experience a displacement and those who do not. These differences highlight the importance of controlling for mother fixed effects in estimating the impacts of the job displacements.

It is notable that children born following a husband's displacement have the same average birth weight as children born to mothers who never experience a husband's displacement. This suggests that there might be no consequences of a husband's displacement for birth weights. On the other hand, these children have birth weights approximately five ounces lower than children who are born before a husband's displacement which suggests that there might in fact be negative consequences. It is important to note that not all of the children

in column 2 have siblings in column 3 and vice versa so the difference in means is not as informative as one might initially think. The across-sibling variation is exploited in the next sections.

Table 4 shows the distribution of birth weights for the children in the sample. One potential concern with the PSID as a source of birth weight information is that children's birth weights are reported by the parents and, thus, subject to recall error. While the misreporting of birth weights cannot be ruled out, it is reassuring that the sample distribution of birth weights is very similar to the nationwide distribution in 1990 (which is the median year of birth for the analysis sample).

4.3 Impacts of Husbands' Displacements

Table 5 presents the regression estimated impact of the impact of a husband's job displacement on children's birth weights. All of the estimates include fixed effects for the mother's age at the time of the birth and a cubic in the year. The controls for the mothers' ages will control for the likelihood that an older women is more likely to have had a displaced husband while her age might also be related to the birth weight of her children.

Echoing the summary statistics shown in the preceding section, the estimate in the column 1, which does not yet include mother fixed effects, indicates that children born following a husband's displacement have the same birth weight, on average, as children who are not born following a husband's displacement. However, the estimate in column 2, which adds mother fixed effects to the model, indicates that we should not conclude that husbands' job displacements do not affect infant health. The estimate in column 2 suggests that when we use a more appropriate counterfactual, the children's older siblings who were born before the displacement, we do observe an impact on birth weights. The point estimate, which is significant at the ten percent level, suggests that a husband's displacement reduces subsequent children's birth weights by four percent on average. The point estimate is slightly larger,

and statistically significant at the five percent level, when controls for the child's birth order and sex are included in the model (column 3).

Columns 4 through 6 show the estimated impact on the probability that a child is low birth weight. Although they are too imprecisely estimated for us to be able to reject zero at conventional significance levels, the point estimates suggest that a husband's displacement increases the probability that a child is low birth weight by 1.7 percentage points. Given a that the baseline probability that a child is low birth weight is approximately four percent, the economic magnitude of this estimate is quite large.[12]

Although the definition of low birth weight used in the preceding analysis is standard, it is rather arbitrary. Further, we might be interested in knowing the impact on the full range of the birth weight distribution. Doing so entails estimating the impact on the probability that a child is less than Z ounces for all possible Z. These estimates, based on the model with mother fixed effects with controls for year, sex, and age, are presented in Figure 2 which summarizes the distributional impact. These estimates demonstrate that the impact is concentrated primarily below the median birth weight (120 ounces). It is also important to note the economic significance of the impacts at the very low end of the birth weight distribution. Because the baseline probabilities are so small in that region, the percentage point increases implied by my estimates constitute a substantial effect in percentage terms.

Table 6 explores heterogeneity in the effects of husbands' job displacements. Columns 1 and 2 interact an indicator for being being born to a mother who has a displaced husband with the timing of the birth. Specifically, the regression includes indicators for a child being born in the two years prior to a husband's displacement, an indicator for a child being born in the year of the displacement or the four following years, and an indicator

[12]As a robustness check, I have estimated the impacts focusing only on displacements due to plant and business closures which are more likely to be exogenous than the broader category of involuntary job losses considered in the preceding analysis. Specifically, I have estimated the effects after dropping women who report that their husbands' first displacements are due to him being laid off or fired. This restriction severely increases the standard errors but the estimates remain roughly similar to those in Table 5.

for a child being born five or more years following a husband's displacement. The omitted category includes children born three or more years before a displacement or being born to a mother who never has a displaced husband. These estimates indicate that both children born immediately following a husband's displacement and those born many years later suffer negative consequences of the displacement.[13]

These results also show that the estimated coefficient on the indicator for being born in the two years prior to a husband's displacement is close to zero. This finding provides evidence against the possibility that changes in households' unobservables simultaneously drive husbands' displacements and reduced birth weights.[14] For example, if family turmoil led to husband's job displacements and poorer infant health, we would probably expect the health effects to manifest themselves prior to the husband's job loss.

Figure 3 shows estimated distributional effects estimated using the same set of three "treatment" variables in each regression with the coefficients on these variables each plotted in its own graph. Again, there is no evidence of an effect prior to the displacement occurring and the effect is similar for children born immediately following the husband's displacement and those born five or more years later.

To the extent to which a child's health at birth can be influenced by behavior during pregnancy, it is possible that a husband's job displacement might have different consequences for male and female children. In particular, parents expecting boys might exert more effort to mitigate the negative effects of displacement if there is a preference for boys. Columns 3 and 4 of Table 6 explores the extent to which there are heterogeneous effects across genders. The point estimates suggest that there are harmful effects for children of both genders. The

[13]In fact, the point estimate suggests that children born five or more years following a husband's displacement may be more harmed than children born immediately afterwards although the estimates are not significantly different from one another.

[14]It is worth noting that it would not be completely unexpected if there was an effect preceding the actual event. The displacement literature consistently finds that individuals' earnings begin to deteriorate prior to displacements taking place. In fact, I will show that this is the case in results that follow.

estimated average effect for females is indeed larger than the estimated effect for male children (5.6% versus 2.9%) which is consistent with a preference for boys but the estimates are not significantly from one another. Although the estimated impact on the conventional measure of low birth weight is larger for females than males, Figure 4 shows that the estimated effects on the lower end of the distribution are roughly the same.

Columns 5 and 6 of Table 6 show the estimated the effects interacted with mothers' levels of education. In particular, the treatment effect is interacted with an indicator variable taking a one if the mother has a high school education or less and it is also interacted with an indicator variable taking a one if the mother has more than a high school education. While the estimates are imprecise, the point estimates suggest that the impact is the impact is negative for women of all education levels. Figure 5 shows the distributional effects by mothers' levels of education. These figures reinforce the finding that the treatment effect is similar for women of different education levels.

The lack of heterogeneity across women's education levels is perhaps surprising. After all, we would think that low income households suffering a negative income shock would be more likely to be thrust into poverty as a result. Table 7, separately estimating the magnitude of the income shock for women of different levels of education, sheds light on these results. In particular, the income shock is much more severe for women with higher education, permanently reducing their incomes by 34%. In contrast, a husband's displacement permanently reduces incomes by 9 to 17% for women with a high school education or less. This might explain why the effect on infant health is just as great for highly educated women as it is for women with less education.

5 Discussion

As a whole, the analysis of husband's displacements reveal that they negatively affect birth weights. The point estimates indicate that a husband's displacement reduces a child's birth weight by 4.4% (5.2 ounces) on average and increases the probability of low birth weight by 1.8%. To put these magnitudes into context, Almond, Chay, and Lee (2004) find that smoking reduces a child's birth weight by 7.1 ounces on average and increases the probability of low birth weight by three to four percent.

I also find a remarkable lack of heterogeneity. The estimates suggest that there are harmful effects for both children born immediately following a job loss and those born many years after a job loss; for both males and females; and for both children born to mothers with no more than a high school education and those born to mothers with at least some college.

If we assume that husbands' job losses only affect birth weights through their effects on family income, then my estimates imply an elasticity of 0.138. This would suggest that cross-sectional comparisons, such the estimates shown in Table 8 which regresses birth weights on family incomes, understate the importance of family income as they imply an elasticity of 0.019.

On the other hand, it is important to keep in mind that I am considering the effect of a negative income *shock* which might have more severe consequences than low income by itself. It is also important to note that, while the most salient feature of a husband's displacement is its large and permanent impact on family income, the impact on birth weights might be generated by aspects of the shock other than the loss of income. For example, a husband's job loss may might reduce birth weights because of its impact on stress.[15] At the same time,

[15]Eskenazi et al. (2007) and Camacho (2008) both find that prenatal stress reduces birth weights. Aizer, Stroud, and Buka (2009), while not finding evidence of negative impacts on birth weights, find negative impacts of prenatal stress on measures of health and cognition at age seven.

if the reason that stress increases is because of the lost income, then we would still be correct in interpreting the estimated effects as resulting from the income shock.

In contrast, it is harder to analyze the consequences of women's job displacements. My analysis of women's work activity indicated that women are significantly more likely to be working in the years around a displacement and, as such, one cannot disentangle the effects of the job loss itself from the effects of working or the effects of what might be causing women to work more during these periods.

6 Conclusion

In this paper, I have examined the impacts of husbands' job displacements on children's birth weights. My findings represent a nice parallel with Sullivan and von Wachter (2009). Whereas there is evidence that mortality improves during recessions (Ruhm 2000), Sullivan and von Wachter (2009) show that individuals' job losses increase their mortality. Similarly, while Dehejia and Lleras-Muney (2004) present convincing evidence that birth weights improve during recessions, I find that husbands' job displacements have a negative effect on birth weights.

Although these results chip away at the "why do birth weights improve during recessions?" question, much work remains to be done on this topic. My results indicate that some aspects of the macroeconomic conditions besides husband's job losses must play a major role. In fact, these other aspects must play a role so great that they more than offset the negative consequences of husbands' job losses that I find. What might these things be? Dehejia and Lleras-Muney (2004) show that there is positive selection into motherhood during recessions. That is, that women who have children during recessions are the types who would always tend to have healthier children. If that selection is strong enough, it could reconcile our findings. Another possibility is that infant health might be closely related to

women's work-induced stress. That is, infant health might improve during recessions because women are less likely to be working while pregnant. Similarly, women's increased work activity following husbands' displacements (Stephens 2002) might play a role in explaining the accompanying decline in birth weights.

The results of this paper also shed light on the relationship between socioeconomic status and health. Like prior papers, one could think of the displacement as a plausibly exogenous shock to household income. In that sense, my results suggest that the positive cross-sectional relationship between income and infant health is indicative of the causal link. This in turn implies that policies that provide income support, in addition to increasing consumption, can be expected to have the additional benefit of improving health outcomes.

References

Aizer, A., L. Stroud, and S. Buka (2009): "Maternal Stress and Child Well-Being: Evidence from Siblings," Mimeo.

Almond, D., K. Y. Chay, and D. S. Lee (2005): "The Costs of Low Birth Weight," *Quarterly Journal of Economics*, 120(3), 1031–1083.

Behrman, J. R., and M. R. Rosenzweig (2004): "Returns to Birthweight," *The Review of Economics and Statistics*, 86(2), 586–601.

Black, S. E., P. J. Devereux, and K. G. Salvanes (2007): "From the Cradle to the Labor Market? The Effect of Birth Weight on Adult Outcomes," *Quarterly Journal of Economics*, 122(1), 409–439.

Browning, M., A. M. Dano, and E. Heinesen (2006): "Job Displacement and Stress-Related Health Outcomes," *Health Economics*, 15(10), 1061–1075.

Camacho, A. (2008): "Stress and Birth Weight: Evidence from Terrorist Attacks," *American Economic Review Papers and Proceedings*, 98(2), 511–515.

Charles, K. K., and M. Stephens Jr. (2004): "Job Displacement, Disability, and Divorce," *Journal of Labor Economics*, 22(2), 489–522.

Currie, J., and E. Moretti (2007): "Biology as Destiny? Short- and Long-Run Determinants of Intergenerational Transmission of Birth Weight," *Journal of Labor Economics*, 25(2), 231–263.

Dehejia, R., and A. Lleras-Muney (2004): "Booms, Busts, and Babies' Health," *Quarterly Journal of Economics*, 119(3), 1091–1130.

Eliason, M., and D. Storrie (2009): "Does Job Loss Shorten Life?," *Journal of Human Resources*, 44(2), 227–302.

Eskenazi, B., A. R. Marks, R. Catalano, T. Bruckner, and P. G. Toniolo (2007): "Low birthweight in New York city and upstate New York following the events of September 11th," *Human Reproduction*, 22(11), 3013–3020.

Jacobson, L. S., R. J. LaLonde, and D. G. Sullivan (1993): "Earnings losses of displaced workers," *American Economic Review*, 83(4), 685–709.

Kuhn, A., R. Lalive, and J. Zweimüller (2007): "The Public Health Costs of Unemployment," Cahiers de Recherches Economiques du Dpartement d'Econom trie et d'Economie politique (DEEP) 07.08, Universit de Lausanne, Facult des HEC, DEEP.

Lindahl, M. (2005): "Estimating the Effect of Income on Health and Mortality using Lottery Prizes as Exogenous Source of Variation in Income," *Journal of Human Resources*, 40(1), 144–168.

Lindo, J. M. (forthcoming): "Are Children Really Inferior Goods? Evidence from Displacement-driven Income Shocks," *Journal of Human Resources*.

Martikainen, P., N. Maki, and M. Jantti (2007): "The Effects of Unemployment on Mortality following Workplace Downsizing and Workplace Closure: A Register-based Follow-up Study of Finnish Men and Women during Economic Boom and Recession.," *American Journal of Epidemiology*, 165(9), 1070–1075.

Oreopoulos, P., M. Page, and A. H. Stevens (2008): "The Intergenerational Effects of Worker Displacement," *Journal of Labor Economics*, 26(3), 455–483.

Oreopoulos, P., M. Stabile, R. Walld, and L. Roos (2008): "Short, Medium, and Long Term Consequences of Poor Infant Health: An Analysis using Siblings and Twins," *Journal of Human Resources*, 43(1), 88–138.

Page, M., A. H. Stevens, and J. M. Lindo (2009): "Parental Income Shocks and Outcomes of Disadvantaged Youth in the United States," in *An Economic Perspective on the Problems of Disadvantaged Youth*, ed. by J. Gruber, pp. 213–235. University of Chicago Press, Chicago.

Rege, M., K. Telle, and M. Votruba (2009): "The Effect of Plant Downsizing on Disability Pension Utilization," *Journal of European Economic Association*, 35(2).

Royer, H. (2009): "Separated at Girth: US Twin Estimates of the Long-Run and Intergenerational Effects of Fetal Nutrients," *American Economic Journal: Applied Economics*, 1(1), 49–85.

Ruhm, C. J. (1991): "Are Workers Permanently Scarred by Job Displacements?," *The American Economic Review*, 81(1), 319–324.

——— (2000): "Are Recessions Good for Your Health?," *Quarterly Journal of Economics*, 115(2), 617–650.

Salm, M. (2009): "Does job loss cause ill health?," *Health Economics*, 18(9), 1075–1089.

Stephens Jr., M. (2002): "Worker Displacement and the Added Worker Effect," *Journal of Labor Economics*, 20(3), 504–536.

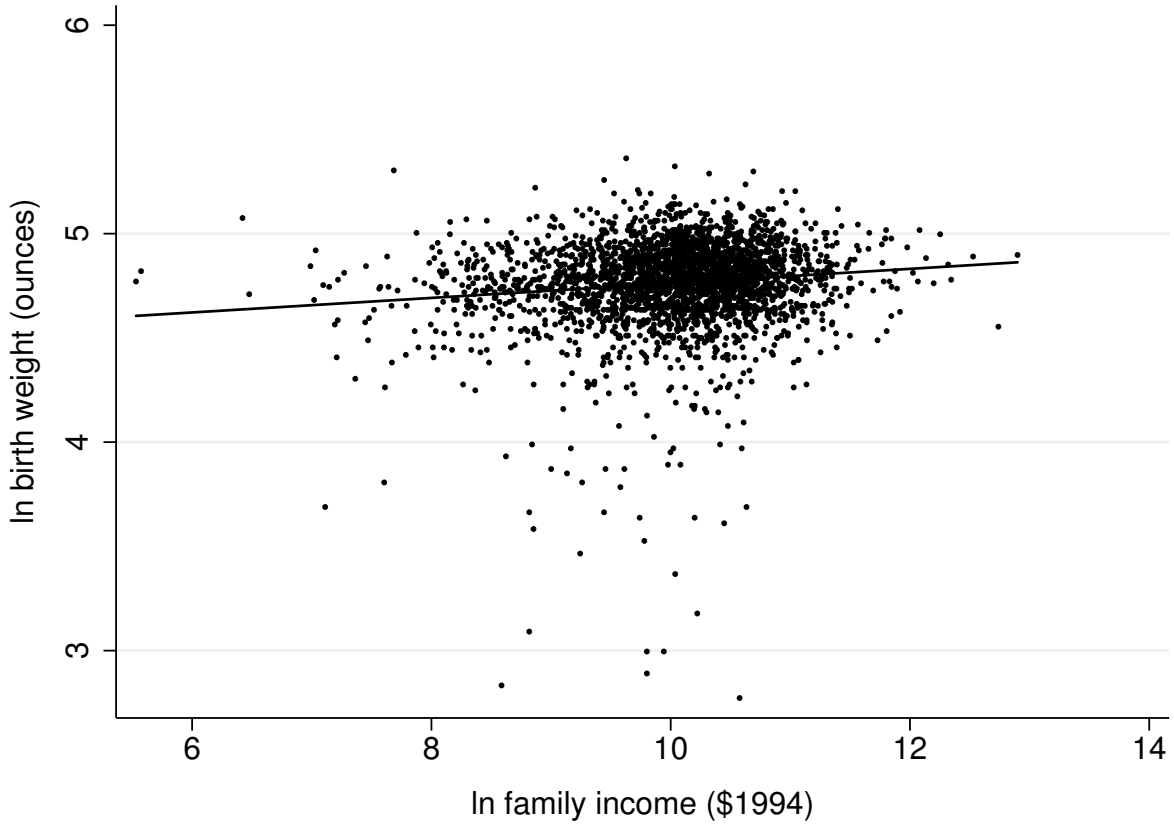
Stevens, A. H. (1997): "Persistent Effects of Job Displacement: The Importance of Multiple Job Losses," *Journal of Labor Economics*, 15(1), 165–188.

Stevens, A. H., and J. Schaller (2009): "Short-run Effects of Parental Job Loss on Childrens Academic Achievement," Mimeo.

Sullivan, D., and T. von Wachter (forthcoming): "Job Displacements and Mortality: An Analysis using Administrative Data," *Quarterly Journal of Economics*.

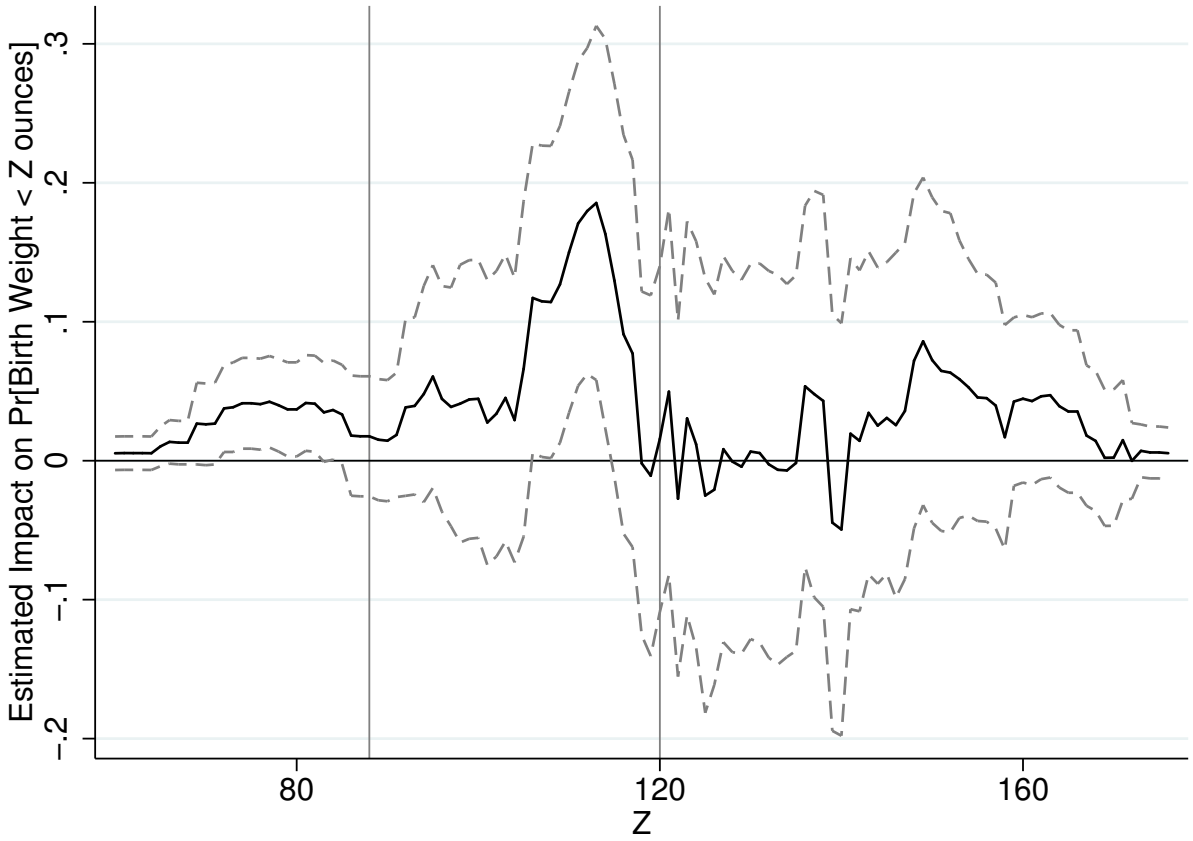
Topel, R. (1990): "Specific capital and unemployment: Measuring the costs and consequences of job loss," *Carnegie-Rochester Conference Series on Public Policy*, 33, 181–214.

Figure 1
Income and Birth Weights



Notes: Data is from the PSID. The collection of dots represent the 2,714 births for which income is not missing in the year before the birth. The fitted line has a slope coefficient of 0.016 with a standard error estimate, clustered on the mother, of 0.007.

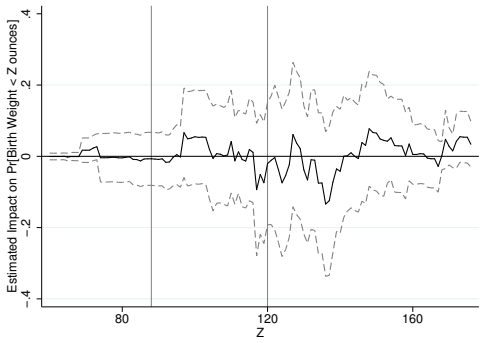
Figure 2
The Distributional Impact of a Husband's Displacement on Birth Weights



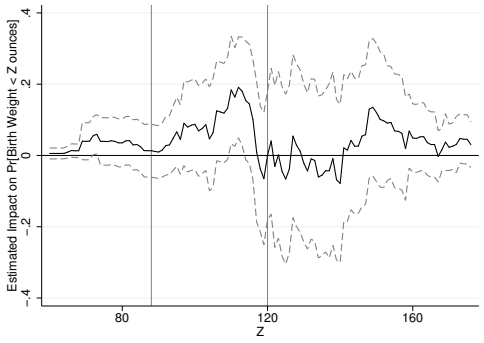
Notes: Data is from the PSID. This figure summarizes the results of over 100 regressions in which the dependent variable is an indicator variable taking one if a child's birth weight is less than Z ounces where Z is plotted on the horizontal axis. The regressor of interest is an indicator variable that takes a one if a child is born following a displacement. The estimated coefficients on this regressor are plotted in the figure along with the 95% confidence intervals. The regressions also include mother fixed effects in addition to controls for the mother's age, the year the child is born, sex, and birth order. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband. Vertical lines are drawn the conventional cutoff for low birth weight (88 ounces) and at the median birth weight (120 ounces).

Figure 3
Distributional Impact of a Husband's Displacement on Birth Weights
By Timing of Birth

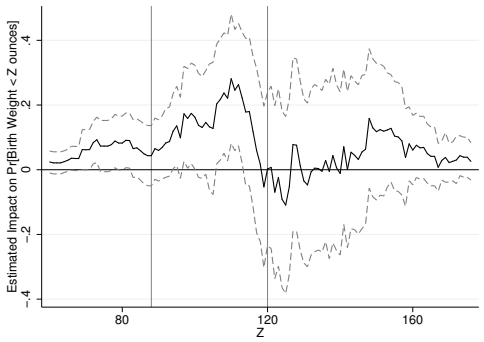
Estimated Impact of being born 1-2 Years Prior to Displacement



Estimated Impact of being born 0-4 Years After Displacement



Estimated Impact of being born 5 or More Years After Displacement

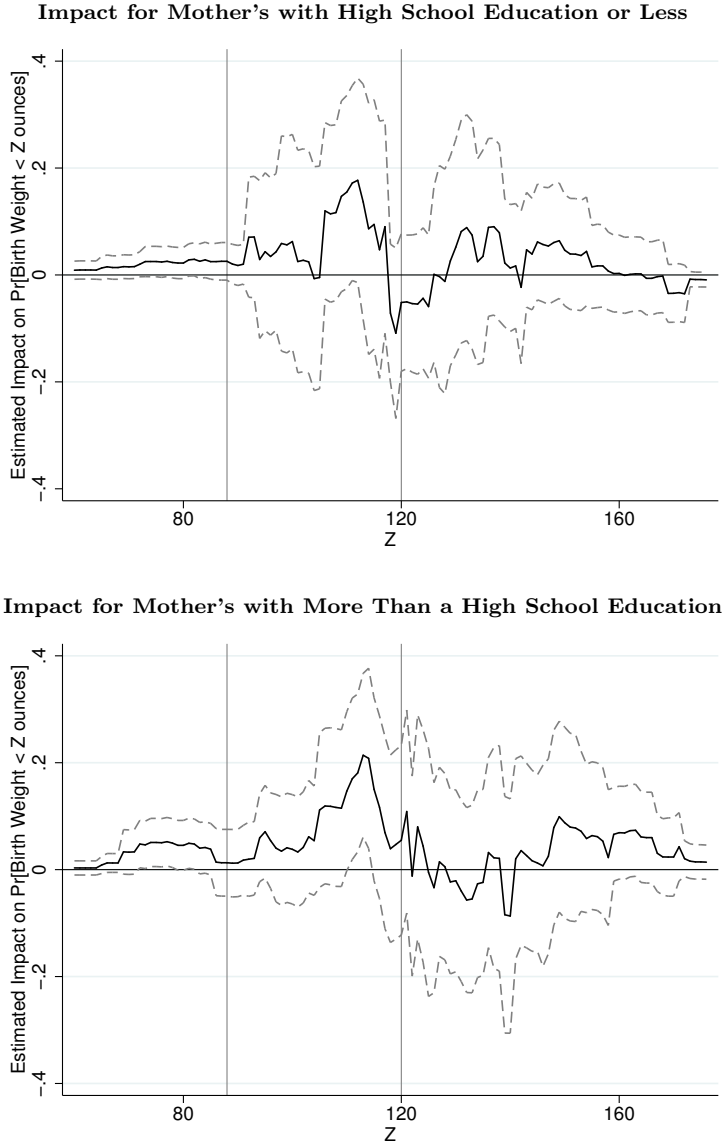


Notes: Data is from the PSID. This figure summarizes the results of over 100 regressions in which the dependent variable is an indicator variable taking one if a child's birth weight is less than Z ounces where Z is plotted on the horizontal axis. The regressors of interest include an indicator taking a one if a child is born 1–2 years prior to a displacement, an indicator taking a one if a child is born 0–4 years following a displacement, and an indicator taking a one if a child is born 5+ years following a displacement. The estimated coefficients on these regressors are plotted in the figure along with the 95% confidence intervals. The regressions also include mother fixed effects in addition to controls for the mother's age, the year the child is born, sex, and birth order. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

Figure 4
Distributional impact of a Husband's Displacement on Birth Weights
By Child Gender

Notes: Data is from the PSID. This figure summarizes the results of over 100 regressions in which the dependent variable is an indicator variable taking one if a child's birth weight is less than Z ounces where Z is plotted on the horizontal axis. The regressors of interest include an indicator taking a one if a child is born following a displacement and they are male and an indicator taking a one if a child is born following a displacement they are female. The estimated coefficients on these regressors are plotted in the figure (along with the 95% confidence intervals). The regressions also include mother fixed effects in addition to controls for the mother's age, the year the child is born, sex, and birth order. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

Figure 5
Distributional impact of a Husband's Displacement on Birth Weights
By Mother's Education



Notes: Data is from the PSID. This figure summarizes the results of over 100 regressions in which the dependent variable is an indicator variable taking one if a child's birth weight is less than Z ounces where Z is plotted on the horizontal axis. The regressors of interest include an indicator taking a one if a child is born following a displacement and their mother has a high school education or less and an indicator taking a one if a child is born following a displacement and their mother has a more than a high school education. The estimated coefficients on these regressors are plotted in the figure (along with the 95% confidence intervals). The regressions also include mother fixed effects in addition to controls for the mother's age, the year the child is born, sex, and birth order. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

Table 1
Estimated Impact of Displacements on Weeks Worked

	Women's Displacements		Husbands' Displacements	
	(1)	(2)	(3)	(4)
2 years prior to displacement	6.367***	4.236***	-0.761	-0.859
	(1.376)	(1.553)	(0.771)	(0.808)
1 year prior to displacement	6.250***	4.186**	-0.973	-1.317
	(1.580)	(1.926)	(0.747)	(0.927)
Year of displacement	5.259***	3.420	-3.430***	-4.601***
	(1.764)	(2.190)	(0.860)	(1.049)
1 year after displacement	-0.067	-1.657	-4.519***	-4.838***
	(1.905)	(2.511)	(0.996)	(1.733)
2 years after displacement	1.850	-0.120	-1.829*	-2.913**
	(2.026)	(2.760)	(0.941)	(1.384)
3 years after displacement	3.420	1.382	-1.726*	-2.648*
	(2.100)	(2.875)	(1.017)	(1.490)
4 years after displacement	4.909**	2.879	-0.369	-1.397
	(2.326)	(3.178)	(0.960)	(1.592)
5 years after displacement	7.101***	2.641	-0.110	-0.814
	(2.345)	(3.710)	(0.890)	(1.845)
Person-year observations	15,510	15,510	15,420	15,420
Person Observations	1,839	1,839	1,836	1,836
Individual fixed effects	yes	yes	yes	yes
Individual Trends	no	yes	no	yes

Notes: All regressions also include year fixed effects and a quartic in age. Standard errors are clustered on the individual. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 2
Estimated Impact of a Husband's Displacements on Log Family Income

Displaced Sample:	Full Sample		Has Children Afterwards	
	(1)	(2)	(3)	(4)
2 years prior to displacement	-0.025	-0.082**	-0.045	-0.088*
	(0.042)	(0.039)	(0.051)	(0.048)
1 year prior to displacement	-0.070	-0.109**	-0.100	-0.120*
	(0.053)	(0.052)	(0.065)	(0.065)
Year of displacement	-0.124**	-0.167***	-0.141**	-0.172**
	(0.054)	(0.058)	(0.064)	(0.070)
1 year after displacement	-0.157***	-0.225***	-0.155**	-0.216***
	(0.059)	(0.064)	(0.066)	(0.075)
2 years after displacement	-0.197***	-0.273***	-0.202***	-0.276***
	(0.061)	(0.067)	(0.068)	(0.081)
3 years after displacement	-0.276***	-0.365***	-0.299***	-0.384***
	(0.072)	(0.077)	(0.079)	(0.091)
4 years after displacement	-0.205***	-0.265***	-0.218***	-0.272***
	(0.062)	(0.072)	(0.068)	(0.087)
5 years after displacement	-0.334***	-0.341***	-0.346***	-0.356***
	(0.067)	(0.087)	(0.072)	(0.105)
Person-year observations	21,149	21,149	19,627	19,627
Person observations	1,883	1,883	1,760	1,760
Individual fixed effects	yes	yes	yes	yes
Individual trends	no	yes	no	yes

Notes: All regressions also include year fixed effects and a quartic in age. Standard errors are clustered on the individual. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3
Summary Statistics By Husband's Displacement Status

	Never	Born before	Born after
Fixed mother characteristics:			
≤ High School Education	0.31	0.37	0.47
Some college	0.29	0.24	0.29
College degree	0.39	0.39	0.23
White	0.92	0.88	0.91
Black	0.07	0.11	0.09
Age when first married	23.2	23.0	21.7
Child-specific characteristics at birth:			
Mother's Age	28.8	27.8	28.4
Year	1991	1989	1990
Birth order	1.9	1.8	2.3
Parental Income ($1994)	35,867	29,314	26,519
male	0.51	0.53	0.52
Birth weight (ounces)	120.3	126.5	121.2
Low birth weight (<88 ounces)	0.05	0.02	0.03
Sample Size	1,768	237	807

Means are calculated using the mother's family weight in the last year she is observed with her first husband. The three columns are mutually exclusive from one another. In order, these columns demonstrate the means for children who are born to a mother who never experiences a husband's displacement, children born before their mother has a displaced husband, and children born following the displacement of a mother's husband. Similarly, the latter three columns are mutually exclusive, presenting means for the children separately based on mother's displacements.

Table 4
Distribution of Birth Weights in Analysis Sample Versus 1990 Vital Statistics

	Fraction in Analysis Sample	Fraction in 1990 Vital Statistics
Birth Weight $<$ 18 ounces	0.00	0.00
Birth Weight $<$ 35 ounces	0.00	0.01
Birth Weight $<$ 53 ounces	0.01	0.01
Birth Weight $<$ 71 ounces	0.02	0.03
Birth Weight $<$ 88 ounces	0.06	0.07
Birth Weight $<$ 106 ounces	0.24	0.23
Birth Weight $<$ 123 ounces	0.60	0.60
Birth Weight $<$ 141 ounces	0.91	0.89
Birth Weight $<$ 159 ounces	1.00	0.98
Birth Weight $<$ 176 ounces	1.00	1.00

Note: Birth weights in the Vital Statistics are actually reported in grams. Their categories (in 500s of grams) have been converted and rounded to ounces to be consistent with the units used to measure birth weights in the PSID. 1990 is chosen as the comparison year because it is the median year of birth for the analysis sample.

Table 5
Estimated Impact of a Husband's Displacement on Birth Weight

Dependent variable:	ln birth weight			Weight < 88 ounces		
	(1)	(2)	(3)	(4)	(5)	(6)
Born after a displacement	0.008	-0.040*	-0.044**	-0.018**	0.017	0.018
	(0.010)	(0.022)	(0.022)	(0.009)	(0.021)	(0.022)
Child observations	2,812	2,812	2,812	2,812	2,812	2,812
Mothers	1,907	1,907	1,907	1,907	1,907	1,907
Mother fixed effects	no	yes	yes	no	yes	yes
Additional controls	no	no	yes	no	no	yes

Notes: Additional controls include sex and birth order fixed effects. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Estimated Impact of a Husband's Displacement on Birth Weight
By Timing of Birth, Child Gender, and Mother's Education

Dependent variable:	ln weight	weight < 88 oz	ln weight	weight < 88 oz	ln weight	weight < 88 oz
	(1)	(2)	(3)	(4)	(5)	(6)
Born 1-2 years prior to displacement	-0.008	-0.007				
	(0.028)	(0.038)				
Born 0-4 years following displacement	-0.051	0.013				
	(0.034)	(0.038)				
Born 5+ years following displacement	-0.098**	0.044				
	(0.044)	(0.047)				
Born after displacement × Male			-0.029	0.000		
			(0.025)	(0.028)		
Born after displacement × Female			-0.056**	0.031		
			(0.024)	(0.021)		
Born after displacement × Mother's Education ≤ HS					-0.032	0.026
					(0.029)	(0.018)
Born after displacement × Mother's Education > HS					-0.052*	0.013
					(0.029)	(0.032)
Child Observations	2,812	2,812	2,812	2,812	2,799	2,799
Mothers	1,907	1,907	1,907	1,907	1,899	1,899
Mother fixed effects	yes	yes	yes	yes	yes	yes
Additional Controls	yes	yes	yes	yes	yes	yes

Notes: Additional controls include sex and birth order fixed effects. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7
Estimated Impact of a Husband's Displacements on Log Family Income
By Women's Levels of Education

Sample:	Mother's Education ≤ HS		Mother's Education > HS	
	(1)	(2)	(3)	(4)
2 years prior to displacement	0.008	-0.043	-0.011	-0.084
	(0.054)	(0.051)	(0.059)	(0.055)
1 year prior to displacement	-0.049	-0.061	-0.034	-0.115*
	(0.078)	(0.078)	(0.066)	(0.067)
Year of displacement	-0.061	-0.131	-0.112	-0.161**
	(0.077)	(0.090)	(0.071)	(0.072)
1 year after displacement	-0.074	-0.181**	-0.164*	-0.233***
	(0.071)	(0.090)	(0.088)	(0.088)
2 years after displacement	-0.118	-0.233**	-0.187**	-0.272***
	(0.084)	(0.107)	(0.082)	(0.083)
3 years after displacement	-0.210*	-0.338***	-0.237***	-0.340***
	(0.110)	(0.129)	(0.086)	(0.091)
4 years after displacement	-0.051	-0.150	-0.241***	-0.321***
	(0.084)	(0.109)	(0.084)	(0.095)
5 years after displacement	-0.096	-0.184	-0.370***	-0.421***
	(0.087)	(0.124)	(0.093)	(0.123)
Person-year observations	8,423	8,423	12,686	12,686
Person observations	754	754	1,122	1,122
Individual fixed effects	yes	yes	yes	yes
Individual trends	no	yes	no	yes

Notes: All regressions also include year fixed effects and a quartic in age. Standard errors are clustered on the individual. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8
Family Income and Birth Weights

Dependent variable:	Ln birth weight		Weight < 88 ounces	
	(1)	(2)	(3)	(4)
Log Family Income	0.016**	0.019**	-0.015***	-0.017**
	(0.007)	(0.008)	(0.006)	(0.007)
Child observations	2,714	2,714	2,714	2,714
Mothers	1,856	1,856	1,856	1,856
Additional controls	no	yes	no	yes

Notes: Additional controls include year fixed effects and mother's age fixed effects. Standard errors are clustered on the mother. Regressions are weighted by the mother's family weight in the last year she is observed with her first husband.

* significant at 10%; ** significant at 5%; *** significant at 1%