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THE EFFECTS OF UNEMPLOYMENT ON CHILDBEARING

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ABSTRACT. Are recessions good for pregnancy? In this paper, I investigate the relationship between unemployment fluctuations, prenatal care utilization, and infant and maternal health. Analyzing the US Natality Detail Files data for the period 1989-99 aggregated by county, year, and race, I find the overall effects of unemployment to be beneficial but conclude that at least some of the apparent benefits may be attributable to the Medicaid 'safety net'.

Keywords: Unemployment, Prenatal Care, Infant and Maternal Health

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Background

Are recessions good for your health? At the end of the 20th century, the simple answer for an average American seems to be: Yes (Ruhm 2000). But what about the traditionally vulnerable groups? In this paper, my goal is to contribute to our understanding of the relationship between economic fluctuations and health by asking a more targeted question: Are recessions good for your pregnancy? Focusing on prenatal care utilization, infant and maternal health, I find the answer to be: Yes, overall, but… In particular, analyzing the US Natality Detail Files data for the 1990's aggregated by county, year, and race, I conclude that at least some of the overall apparent benefits of unemployment may be attributable to the Medicaid 'safety net'.

The relationship between macro-level unemployment fluctuations and health has recently received increased attention in the economics literature. Ruhm (2000, 2003) finds that the general health status - as measured either by cause-specific mortality rates (including infant and neonatal mortality) or by more subtle measures (such as activity limitations and the use of medical care) – improves during temporary economic downturns. Ruhm (2000, 2005) observes that health-related behavior improves during recessions. The author explains his findings by the cyclical fluctuations in non-market time and the related time costs of health-producing activities.

Recently, Dehejia and Lleras-Muney (2004) report reduced incidence of low birth weight and very low birth weight and lower neonatal and post-neonatal mortality rates in times of higher unemployment. In the same paper, they also find a positive impact of

unemployment on prenatal care use. In line with Ruhm's reasoning (Ruhm 2000, 2003, 2005), a possible explanation for this phenomenon is that in times of higher unemployment women face looser time constraints, which increases their ability to obtain appropriate prenatal care. In the case of behaviors and health outcomes related to pregnancy, however, the observed aggregate effects of unemployment may also mask compositional changes. Specifically, as stressed in Dehejia and Lleras-Muney (2004), selection through fertility decisions may play an important role. If, for example, only the most affluent women decide to conceive during temporary economic downturns, the average prenatal care utilization and health outcomes will likely improve.

Importantly, another reason why women in depressed labor markets may get more appropriate medical care is that unemployment makes many of them eligible for Medicaid. For women in low-skilled jobs (which often do not offer employer-sponsored health insurance coverage), eligibility for Medicaid can significantly improve access to prenatal care. While the effects of increased Medicaid eligibility on prenatal care utilization and health outcomes have been studied, the interplay of unemployment and Medicaid in the production of health has not systematically been investigated. Therefore, in the current paper, my goal is to study how the interaction between unemployment changes and Medicaid eligibility affects childbearing.

I use the Natality Detail Files data for years 1989-1999 aggregated to county/year/race cells and estimate the effects of unemployment – overall, direct ('unemployment per se'), and indirect (through increased Medicaid eligibility) – on prenatal care utilization and health outcomes. By conducting the analysis at the county level rather than by state (as previous research has done), I am able to construct better

proxies for the actual economic conditions facing pregnant women. Since unemployment varies greatly within states and local labor market conditions are important for Medicaid eligibility (to be discussed shortly), a county-level analysis seems superior. In some of my sensitivity analyses, however, I use state-level cells and unemployment rates for comparison purposes.

As in Dehejia and Lleras-Muney (2004), I employ several measures of prenatal care use and infant health. In addition, I study the effects of unemployment on a key but overlooked outcome -- *maternal* complications of pregnancy and delivery. My econometric analysis indicates that, overall, higher unemployment at the county level is associated with improved infant outcomes especially among whites. Among blacks, unemployment increases prenatal care utilization (and potentially improves maternal health). In some cases, both unemployment per se and unemployment interacted with Medicaid eligibility seem to contribute to the beneficial effects. In others, the Medicaid 'safety net' acts to mitigate, completely offset, or outweigh detrimental effects of unemployment.

Framework

Changes in unemployment lead to changes in resources available to women of reproductive age. This, in turn, has consequences for selection into pregnancy as well as for behavior and health while pregnant. Figure 1 lays out these two paths (columns) and the various ways these two paths may be affected by unemployment.

First, as unemployment increases, the average wage income and fringe benefits (such as private health insurance) decrease. According to the standard economic theory

of fertility (Becker 1960), this will lead to a reduction in birth rates (upper left cell of Figure 1). In perfect markets, the negative income effect will only demonstrate itself in the presence of long-run unemployment changes (because permanent rather than transitory income determines fertility). As Dehejia and Lleras-Muney (2004) argue, however, the existence of credit constraints may lead to significant fertility reactions even in the short run. Further, in response to the negative income shock, prenatal care utilization (a normal good) will fall among those pregnant (upper right cell of Figure 1). The impacts on health outcomes will depend on the relative magnitudes of the income effects for healthy versus unhealthy behaviors (Ruhm 2000, Dehejia and Lleras-Muney 2004). Ruhm (2005) estimates that the pure income effect of unemployment on health-related behavior is weak and Ruhm (2003) associates the negative income shock with an increase in medical problems and activity limitations.

Second, higher unemployment leads to more leisure (or non-work) time. As the opportunity costs fall, the demand for children (and thus fertility) will increase (Becker 1965; middle left cell of Figure 1). As Dehejia and Lleras-Muney (2004) point out, the substitution effect – moving from labor market to childbearing – will be especially strong among women whose human capital depreciates slowly. For women who have decided to become pregnant, the demand for time-intensive activities (such as regular prenatal care visits and exercise) will increase (Becker 1965, Ruhm 2000; middle right cell of Figure 1). In an empirical analysis, Ruhm (2005) finds support for this hypothesis and associates the non-market time available during times of higher unemployment with improvements in health-related behavior. Once again, however, the effects on health (conditional on becoming pregnant) will theoretically be ambiguous.

I contribute to this conceptual framework by adding a third row to Figure 1 -- the possible role that Medicaid plays in enforcing or mitigating the effects of unemployment. Theoretically, the effect of unemployment on Medicaid enrollment is ambiguous. On the one hand, lower incomes in times of higher unemployment will qualify additional women for the receipt of Medicaid. On the other, higher unemployment may lead to fiscal pressures and budget cuts (Cawley and Simon 2005). In empirical studies, Holahan and Garrett (2001) calculate that a 1 percentage point increase in unemployment will lead to an increase in Medicaid enrollment by 1.5 million[1] and Cawley and Simon (2005) also find Medicaid enrollment to be counter-cyclical. These two studies reveal the potential for a Medicaid 'safety net' effect.

Changes in Medicaid eligibility may affect both selection into pregnancy and circumstances during pregnancy (conditional on becoming pregnant). In a recent study, Bitler and Zavodny (2004) show that the effects of Medicaid on fertility are theoretically ambiguous since Medicaid gives pro-natalist incentives by lowering the costs of prenatal and infant medical care but also potentially anti-natalist incentives by funding abortions in some states (lower left cell of Figure 1). In an empirical analysis, the authors find the pro-natalist effects to dominate (especially among low-educated, single, and white women). In theory, higher Medicaid eligibility should also lead to increased prenatal care utilization and improved health conditional on being pregnant (lower right cell of Figure 1). Empirical studies generally find supportive evidence for these hypotheses (see, for example, Currie and Grogger (2002) for evidence on prenatal care use and infant health and Kutinova and Conway (2005) for evidence on prenatal care use and maternal health).

[1] This number includes non-disabled adults, children, and the disabled.

Given all of these effects of unemployment on fertility, prenatal care use, and health, the overall impact cannot easily be determined. Moreover, previous studies suggest that the effects will likely differ by women's characteristics such as race, marital status, and education (Bitler and Zavodny 2004, Dehejia and Lleras-Muney 2004). The evidence to date suggests that, in times of higher unemployment, fertility decreases especially among single blacks (Dehejia and Lleras-Muney 2004) and among low-educated women (Bitler and Zavodny 2004). Prenatal care use increases in aggregate data (Dehejia and Lleras-Muney 2004) and general health-related behaviors improve in both aggregate and individual-level data (Ruhm 2000, 2005). Finally, infant health improves with unemployment in aggregate data (Dehejia and Lleras-Muney 2004), overall health (including infant health) improves in aggregate data (Ruhm 2000), and medical problems and activity limitations decrease with unemployment in individual-level data (Ruhm 2003). So far, no systematic study explicitly investigating the interplay of unemployment and Medicaid, focusing on local labor markets, and considering a broader range of outcomes (including a key outcome of pregnancy -- maternal health) has been conducted. The primary goal of this paper is to fill this gap.

Data and Methods

Data

The main source of data are the Natality Detail Files for years 1989-1999 (US Dept. of Health and Human Services 1991-2000). Since 1985, the files have included information on all US births and so have contained more than 3 million observations

annually. Traditionally, infant health measures (such as birth weight and the Apgar score) and various maternal characteristics (such as age, marital status, race, ethnic origin, education, and place of residence) have been reported. In addition, since 1989, variables describing maternal morbidity during pregnancy and delivery have also been included.[2]

In this study, foreign residents are excluded from the analysis. Further, women from Louisiana and Nebraska in the year 1989, Oklahoma in years 1989-1990, and New York in years 1989-1991 are excluded due to missing information on maternal health. Mothers from Washington State in years 1989-1991 are excluded due to missing information on marital status and those from New Hampshire in years 1989-1992 due to missing information on ethnicity. Only non-Hispanic black and white women are included in the analysis (as in Currie and Grogger 2002 and Kutinova and Conway 2005). Also, the sample is restricted to women between 19 and 50 years of age who had a singleton birth and resided in a county with population of at least 100,000 people (FIPS codes for smaller counties are not available in the natality files making it impossible to match county-level unemployment rates to these observations).

In the main model specification, the Natality Detail Files data are aggregated to county/year/race cells and are merged with county-level annual unemployment rates from the 2002 Area Resource File. Six-month lags of unemployment are used in order to allow the economic conditions to impact women at a crucial stage of their pregnancies

[2] Sixteen "medical risk factors" (anemia, cardiac disease, lung disease, diabetes, genital herpes, hydramnios/oligohydramnios, hemoglobinopathy, hypertension chronic and pregnancy-associated, eclampsia, incompetent cervix, previous infant 4000+ grams, previous preterm or small-for-gestational age infant, renal disease, Rh sensitization, and uterine bleeding) and fifteen "complications of labor and/or delivery" (febrile, meconium, premature rupture of membrane, abruption placenta, placenta previa, other excessive bleeding, seizures during labor, precipitous labor, prolonged labor, dysfunctional labor, breech/malpresentation, cephalopelvic disproportion, cord prolapse, anesthetic complication, and fetal distress) are separately identified in the natality files.

rather than just before delivery.[3] In my data, there is substantial variation in unemployment within states which would not be captured by simple across-state comparisons (Figure 2). In particular, the standard deviation of the state-level unemployment rates is 1.23 and the average standard deviation of county-level unemployment rates *within state* is 1.48. In this case, the state unemployment rates mask significant county-level differences. Performing the analysis on the county level rather than by state therefore allows me to construct more precise proxies for the actual economic conditions facing pregnant women. And, as Baughman (2005) shows, local labor market conditions play an important role in determining Medicaid coverage.

To mitigate the problem of influential observations in very small samples, cells with less than 100 pregnancies are excluded from the estimations.[4] The omission of small counties is common in infant health studies (Corman and Grossman 1985, Corman et al. 1987). The above restrictions leave me with 3,426 county/year observations in the black cohort and 5,125 observations in the white cohort.[5]

[3] Since annual unemployment rates are used, all deliveries in the last 6 months of 'year 1' or in the first 6 months of 'year 2' are assigned unemployment rates for 'year 1'. The same algorithm is later employed to assign Medicaid eligibility rules. In principle, different lags should be used to study selection into pregnancy and behavior conditional on becoming pregnant. The use of annual unemployment rates and Medicaid eligibility rules, however, makes a precise distinction impossible.

[4] Because of the large within-state variation in unemployment and the importance of local labor markets for the effectiveness of government policies, a county-level analysis has many advantages over a state-level analysis. Admittedly, however, there are drawbacks to this approach as well. Most importantly, by excluding small counties, rural areas may be left out from the analysis. As descriptive statistics suggest, women included in my baseline sample have slightly higher utilization of prenatal care and better infant and maternal health outcomes than the state-level average (Tables 1 and 3). As a sensitivity check, I have therefore reestimated the models in this paper using state/year/race cells. The results remain qualitatively the same (see 'State-Level Analyses' below).

[5] In order to verify that potential racial differences in my results are not driven primarily by different sample sizes, I have also estimated all the models for white women including only counties used in the estimations for blacks. The results remained qualitatively the same.

First, I estimate the effects of the unemployment rate on prenatal care utilization. Two measures of prenatal care use are employed: the percentage of women receiving prenatal care in the first trimester of pregnancy and the percentage of women with 'adequate' or 'intermediate' prenatal care (on the Kessner adequacy scale). Next, I turn to two measures of infant health: the incidences of low birth weight (birth weight between 1,500 and 2,500 grams) and very low birth weight (birth weight below 1,500 grams). Finally, I explore four measures of maternal health: the incidences of placental abruption[6], anemia[7], pregnancy-associated hypertension[8], and 'any maternal complication' (i.e., any of the above) in pregnant women. As Haas et al. (1993) note in their study of maternal complications in the US: "Although only 10 per 100,000 women die from a complication of pregnancy or childbirth, 60% of women receive medical care for some complication of pregnancy, and 30% suffer complications that result in serious morbidity." (p.61) Therefore, adding maternal health measures to infant health measures in a study of pregnancy outcomes seems highly relevant. Placental abruption, anemia, and pregnancy-related hypertension have all been identified in the medical and public health literatures as important causes of maternal morbidity that are sensitive to interventions during the prenatal period (Laditka et al. 2005, Bashiri et al. 2003, Makrides et al. 2003, Villar et al. 2003, Scholl et al. 1994, Haas et al. 1993, Sachs et al. 1988). As such, these morbidities are among those most likely to be affected by the economic environment women face.

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[6] "Premature separation of a normally implanted placenta from the uterus." (CDC)

[7] "Hemoglobin level of less than 10.0 g/dL during pregnancy or a hematocrit of less than 30 percent during pregnancy." (CDC)

[8] "An increase of blood pressure of at least 30mm Hg systolic or 15mm Hg diastolic on two measurements taken 6 hours apart after the 20th week of gestation." (CDC)

Empirical Strategy

Following earlier studies on the effects of unemployment changes on health-related behavior and health, I first estimate prenatal care use, infant and maternal health models in the following general form:

$$y_{ijt} = \beta_0 + \beta_1 * \text{unemployment rate}_{jt} + \beta_2 * J + \beta_3 * T + \varepsilon_{ijt},$$

where y is a measure of prenatal care use, infant or maternal health, i indexes race cohorts, j counties, and t years. J and T denote vectors of county and year dummies, respectively. In the above equation, β_1 measures the overall effects of unemployment on the outcomes of interest. In order to capture the *overall* (i.e., reduced form) effects of unemployment, cohort characteristics which change as 'selection into pregnancy' changes are not included on the right hand side.

Next, in order to investigate the interaction between unemployment and Medicaid in their effects on childbearing, I turn to models in the following form:

$$y_{ijt} = \gamma_0 + \gamma_1 * \text{unemployment rate}_{jt} + \gamma_2 * \text{Medicaid eligibility}_{st} + \gamma_3 * \text{unemployment rate}_{jt} * \text{Medicaid eligibility}_{st} + \gamma_4 * J + \gamma_5 * T + \mu_{ijt},$$

where i indexes race cohorts, j counties, s states, t years, and y, J, and T are defined as above. Medicaid eligibility is measured as the income cutoff (as a percent of the federal poverty line) below which pregnant women qualified for Medicaid in a given state and year. This data comes from Hill (1992) and the National Governors' Association (2003) and six-month lags are used. In the interacted models, γ_1 measures the effects of 'unemployment per se' and γ_3 the effects of the unemployment and

Medicaid eligibility interaction. As discussed above, the signs of these coefficients are theoretically ambiguous but it seems reasonable to assume that both 'unemployment per se' (γ_1) and the Medicaid 'safety net' (γ_3) will have a significant and independent impact on the outcomes of interest.

All models in this paper are estimated with OLS and robust standard errors correcting for heteroskedasticity and clustering at the county level are calculated.[9] Observations are weighted by the number of individuals in each county/year/race cell.

Results

Descriptive Statistics

Following Dehejia and Lleras-Muney (2004), I first estimate all models stratified by mother's race. As has previously been demonstrated, black and white women have different fertility and pregnancy-related behavior and there are also large 'unexplained' racial disparities in infant and maternal health (e.g., Dubay et al. 2001, Currie and Grogger 2002, Kutinova and Conway 2005, Conway and Kutinova 2005). Therefore, it seems important to let the effects of unemployment (and Medicaid eligibility) differ by race.

The racial disparities documented elsewhere can also be observed in my data (Table 1). In particular, black mothers are less likely than white mothers to obtain prenatal care in the first trimester and to receive 'adequate' or 'intermediate' care. The

[9] As a sensitivity check, all models have also been estimated with tobit (to account for the fact that the values of prenatal care and infant health measures are bounded between 0 and 100 and those of maternal health measures between 0 and 1,000; i.e. the variables are censored). The coefficients of interest are robust to the choice of the estimation method. As suggested in Bertrand et al. (2004), clustering at the county level has been performed in order to account for a possible serial correlation within counties.

incidence of low birth weight among black infants is more than twice that among white infants (9.06% vs. 3.73%, $p<0.01$). The racial gap in the incidence of very-low birth weight is even bigger (2.64% vs. 0.72%, $p<0.01$). Turning to maternal health, black women again have poorer outcomes than whites. In particular, 6.64% of black women and 4.90% of white women suffer from at least one of the morbidities studied ($p<0.01$) and the racial gap is the largest for the incidence of anemia (3.19% vs. 1.43%, $p<0.01$). Some of these differences may be attributable to the fact that black women are, on average, younger, less educated, and less likely to be married than whites (Table 1).

As to the economic environment facing the two groups of women, it can be seen that black mothers live in *states* with slightly higher average unemployment rates (5.90 vs. 5.80, $p<0.05$; Table 1). The racial disparity in the average *county*-level unemployment rate is even higher (5.92 vs. 5.34, $p<0.01$). The finding that the variation in the economic conditions (proxied by the unemployment rate) across counties is larger than the variation across states adds justification for the choice of the county-level variable in the econometric analysis. Finally, the descriptive statistics demonstrate that black and white women live in counties with similar per-capita income levels and Medicaid eligibility rates.

Baseline Results

In the baseline model similar to that in Dehejia and Lleras-Muney (2004), the county-level unemployment rate is the sole determinant (along with county and year dummies) of prenatal care use, infant and maternal health (upper panel of Table 2; combined effects from all cells of Figure 1). In this specification, the reduced-form effect

of unemployment on prenatal care use is positive and statistically significant among blacks and insignificant (negative when measured by prenatal care initiation in the first trimester and positive when measured by 'adequate/intermediate' prenatal care) among whites. While Dehejia and Llleras-Muney (2004) find positive effects for both races, a negative (or zero) effect of unemployment among whites is consistent with their more general finding of 'negative selection' among women in this cohort. As in Dehejia and Llleras-Muney (2004), unemployment has a beneficial effect on infant health across the races (statistically significant only among whites). An equally strong beneficial effect is not observed for maternal health.[10]

Models that add Medicaid eligibility and an interaction between unemployment and Medicaid eligibility to the unemployment rate on the right hand side (bottom panel of Table 2) help disentangle some of the overall effects observed above. It seems that unemployment per se (first and second rows of Figure 1) contributes to the higher prenatal care use among blacks and that Medicaid (third row of Figure 1) strengthens this effect (coefficients statistically insignificant). Among whites, on the other hand, unemployment per se significantly decreases prenatal care use but Medicaid eligibility partly offsets this effect. Using the estimated coefficients, I have calculated the threshold level of Medicaid eligibility (M^), i.e., the level of Medicaid eligibility needed to completely offset the detrimental effects of unemployment on the outcomes of interest. Note that when M^ is low, the overall effects of unemployment in the simple models (with unemployment as the sole explanatory variable) are driven by the unemployment*Medicaid eligibility interaction. When M^ is high, the effects of

[10] Note that *positive* signs on prenatal care measures indicate an increased use of prenatal care and *negative* signs on adverse infant and maternal health outcomes indicate improvements and infant and maternal health.

unemployment per se dominate. Similarly, U^ is used to indicate the level of unemployment at which the effects of Medicaid on prenatal care use (and health outcomes) switch from those driven by Medicaid per se to those driven by the unemployment*Medicaid interaction. As can be seen (Table 2), the noninteracted Medicaid variable sometimes has the counter-intuitive sign (decreasing prenatal care use) while the unemployment*Medicaid interaction acts in the expected direction. Fortunately, the level of U^ is mostly very low (reaching 'out-of-sample' values), indicating that the effects of Medicaid per se are not relevant for the range of unemployment rates actually observed.

Turning to infant health, Medicaid seems to be playing a role in the reduction of low birth weight among both races (significant for whites; bottom panel of Table 2). Similarly, Medicaid in times of higher unemployment has a weak beneficial effect on maternal health. While mostly insignificant, the coefficients on the unemployment*Medicaid eligibility variable are consistently negative. Furthermore, among white women, the Medicaid 'safety net' significantly reduces the incidence of placental abruption (bottom panel of Table 2).

Thus, overall, the uninteracted results suggest that black women experience increases in prenatal care use (and potentially small improvements in health outcomes) when unemployment temporarily increases. As the interacted results show, Medicaid may be playing a beneficial role. The statistical significance of these results is weak, however. Among whites, infant health improves and prenatal care utilization and maternal health do not change significantly when unemployment (overall) increases. While these aggregate findings may seem puzzling, the interacted models shed more light

on the mechanisms behind the observed reduced-form results. In particular, as expected, Medicaid eligibility in times of higher unemployment has a beneficial impact on all three sets of outcomes - increasing prenatal care utilization and improving infant and maternal health. Since unemployment per se mostly worsens outcomes, the resulting reduced-form impacts of unemployment reflect the relative magnitudes of the counteracting effects.

There are several reasons why the effects of unemployment per se may differ across the races (as well as across the outcomes studied). As mentioned above, unemployment induces income and substitution effects which influence 'selection into pregnancy' as well as women's behavior while pregnant (first and second rows of Figure 1). And, it seems likely that the relative sizes of the substitution and income effects as well as their impacts on selection and behavior will differ. For example, Dehejia and Lleras-Muney (2004) argue that the income effect is relatively stronger among black women who tend to be more credit constrained and that this effect demonstrates itself in a strong positive selection among blacks. Infant health improvements among whites, on the other hand, seem to be attributable to healthier behavior of white women during pregnancy and these behavioral changes, in turn, are likely a consequence of significant substitution effects (Dehejia and Lleras-Muney 2004). No matter what the impacts of unemployment per se, however, the effects of the Medicaid 'safety net' (third row of Figure 1) seem to be -- at least weakly -- beneficial for both racial cohorts and across all sets of outcomes studied.

State-Level Analyses

As discussed above, a county-level analysis is superior in many respects to a state-level analysis. There are, however, limitations to using counties as well. Most importantly, the Natality Detail Files do not report geographic codes for counties with population of less than 100,000. In addition, to mitigate the problem of influential observations in very small samples, I have excluded county/year/race cells with less than 100 births from the estimations. Thus, my analysis omits the most sparsely populated (rural) areas. To investigate the possibility of a bias, I have reestimated the baseline models using *state*/year/race cells. This comparison is also useful in judging the potential limitations of using state level unemployment rates, as previous studies have done.

As descriptive statistics suggest, women included in my baseline sample have slightly higher utilization of prenatal care and better infant and maternal health outcomes than the state-level average (Tables 1 and 3). They are also more likely to be older, highly educated and married. To test the sensitivity of my results to the level of aggregation, I therefore consider two alternatives to the baseline county-level models: 1. a county-level analysis with state unemployment rates (Table 4) and 2. a state-level analysis with state unemployment rates (Table 5).

In the reduced form models with unemployment as the sole explanatory variable of interest, both state-level analyses confirm the county-level results (upper panels of Tables 2, 4, and 5). In particular, in all three specifications, unemployment significantly increases prenatal care use among black mothers and improves infant health among whites. Thus, the main findings are robust to the level of aggregation. This result also

suggests that using state unemployment rates (as previous research has done) may be a reasonable practice.

The unit of analysis and the unemployment measure seem more important in the models that add Medicaid eligibility and the unemployment*Medicaid interaction on the right hand side (lower panels of Tables 2, 4, and 5). This is an appealing finding since the benefits of using county-level data should be the largest in models which already have a state-level variable – Medicaid eligibility – on the right hand side. It is noteworthy, however, that the differences in results across the three model specifications are again not large. In particular, among black women, the interacted results do not reach statistical significance in any of the model specifications but the coefficients mostly have the same sign. Among white women, unemployment per se decreases prenatal care use and the Medicaid 'safety net' increases it across all three specifications. Not surprisingly, the results are most significant when county-level cells are used (lower panels of Tables 2 and 4). In fact, the Medicaid 'safety net' is associated with significant benefits to infant and maternal health only when county-level cells are used (lower panels of Tables 2 and 4) and the results are most consistent across outcomes studied when county-level unemployment is also employed (lower panel of Tables 2).

Overall, the above sensitivity checks suggest that using county-level data is more important in the interacted models than in the simplest reduced form but, in both cases, the main findings seem reasonably robust to the level of aggregation.

Stratification by Socioeconomic Status

As previous research suggests, individuals with low socioeconomic status are the most vulnerable to the cyclical unemployment changes. For example, Hines et al. (2001) conduct a systematic review of the literature and corroborate the finding that "[…] labor market outcomes are procyclical, with greater sensitivity among lower skilled groups." (p.5) Furthermore, since Medicaid is designed as a program for credit constrained populations, the 'safety net' should play the largest role among economically disadvantaged women. In order to test this hypothesis, I stratify the baseline sample by two measures of socioeconomic status: marriage and education.

Marital Status

Within both racial cohorts, there are large differences in the outcomes and characteristics of married and single women (Table 6). For example, among blacks, 64.36% of single women and 81.72% of married women receive prenatal care in the first trimester ($p<0.01$). Among whites, the corresponding figures are 72.72% and 91.31% ($p<0.01$). As to infant and maternal health, single women are, on average, more likely to deliver a low birth weight infant (10.28% vs. 6.94% among blacks and 6.00% vs. 3.29% among whites, $p<0.01$) and to suffer from at least one of the maternal morbidities studied (6.71% vs. 6.40% among blacks and 5.55% vs. 4.77% among whites, $p<0.01$). Of course, many of these disparities are probably partly driven by differences in socio-economic status. Single women of both races are younger and less educated, on average. Differences in the macroeconomic conditions facing the different cohorts of mothers are remarkable as well. Most interestingly, the county-level unemployment rate (much more

than the state-level measure) varies substantially with single pregnant women of both races facing higher unemployment than their married counterparts (Table 6).

When the samples are stratified by marital status, single women of both races seem to be more strongly affected by unemployment changes than married women (upper panel of Table 7). Namely, unemployment significantly increases prenatal care utilization among single black women and decreases it among single whites; infant health improves with unemployment among both single blacks and single whites; and, there is some evidence suggesting that maternal health improves with unemployment among single blacks. Married women are only weakly affected.

The models which explicitly take the interaction between unemployment and Medicaid eligibility into account yield additional interesting insights (bottom panel of Table 7). Among blacks (both single and married), the results generally do not reach statistical significance. There is one exception, however: Medicaid in times of higher unemployment significantly increases 'adequate/intermediate' prenatal care use among married blacks. The results for single whites are very informative. In this cohort, unemployment per se decreases prenatal care use and potentially leads to a deterioration of infant and maternal health. In all these cases, however, the unemployment*Medicaid eligibility interaction acts to (partially) offset unemployment's detrimental effects. The Medicaid 'safety net' therefore seems particularly operative in this group of women. Among married whites, prenatal care use again decreases with unemployment per se and increases with Medicaid but the results for infant and maternal health are more mixed.

Education

Among both black and white women, education is a significant correlate of prenatal care use and infant and maternal health (Table 8). For example, among blacks, 56.58% of women with 'less than 12 years' of education, 71.82% of women with '12 to 15 years' of education, and 88.40% of women with '16 or more years' of education initiate prenatal care in the first trimester ($p<0.01$). The corresponding numbers are 69.18%, 87.31%, and 95.33% among whites ($p<0.01$). Less educated women of both races also deliver more low birth weight and very-low birth weight infants and have higher incidences of placental abruption and anemia. Pregnancy-associated hypertension, on the other hand, does not seem to fall monotonically with education. As expected, less educated black and white mothers are younger and less likely to be married. Notably, the county-level unemployment rate (more than the state-level variable) facing pregnant women consistently decreases with education. The county-level per-capita income increases.

In the models stratified by education, the prenatal care increases in times of higher unemployment previously observed among black women occur only among those with 'less than 12 years' or '12 to 15 years' of schooling (upper panel of Table 9). Among highly-educated blacks ('16 or more years' of education) and among whites of all education levels, the unemployment rate is associated with prenatal care decreases or with no significant change. With respect to infant health, there is some evidence of general improvements in times of higher unemployment across all racial and education cohorts (with the exception of highly-educated blacks). White women with '12 to 15 years' or '16 or more years' of education seem most strongly affected. The effects of

unemployment on maternal health exhibit no clear pattern. (If anything, blacks with '12 to 15 years' and whites with 'less than 12 years' of education seem to benefit and more educated whites seem to be hurt.)

Once again, the interacted models with unemployment and Medicaid eligibility reveal additional interesting relationships (bottom panel of Table 9). Among blacks with 'less than 12 years' and '12 to 15 years' of education, both unemployment per se and unemployment interacted with Medicaid eligibility potentially increase prenatal care use. Among highly-educated blacks ('16 or more years' of education; coefficients insignificant) and among whites of all education levels (significant effects), prenatal care decreases with unemployment per se but Medicaid has a protective effect.

The results for infant health are suggestive. Namely, unemployment per se seems deleterious and unemployment*Medicaid eligibility beneficial among black women with '12 to 15 years' of education and among whites with 'less than 12 years' of schooling. Women from these groups are likely the most vulnerable to the cyclical unemployment changes but they are also those most likely to be enrolled in Medicaid when the economy temporarily deteriorates. Similarly, unemployment per se increases maternal complications and unemployment*Medicaid eligibility decreases them among black women with 'less than 12 years' of education and among whites with 'less than 12 years' or '12 to 15 years' of schooling. The results for other cohorts are mixed. Overall, the above findings are consistent with the hypothesis that unemployment per se may be harmful for women with low socioeconomic status and that Medicaid eligibility acts to mitigate the unemployment's detrimental effects.

The Effects of Unemployment on Cohort Characteristics

As discussed above, the effects of unemployment (and Medicaid) on aggregate-level behaviors and health outcomes may arise both from differential changes in fertility across different groups of women (first column of Figure 1) and from changes in behaviors and outcomes conditional on becoming pregnant (second column of Figure 1). In order to investigate how much of the effects of unemployment observed in this paper are due to 'selection into pregnancy', I regress the county/year-specific mean characteristics of the two racial cohorts on the same set of explanatory variables employed above (Table 10).

The reduced-form effects of unemployment on maternal characteristics are highly significant (upper panel of Table 10; combined effects from the first column of Figure 1). In particular, in times of higher unemployment, the percentages of married and older women significantly increase among both blacks and whites. This finding is intuitively appealing because married and older women are less likely to be credit constrained (and thus subjected to a large negative income shock caused by unemployment) than single and young mothers.

The interacted results add further insights (bottom panel of Table 10). Specifically, among blacks, unemployment per se (upper and middle left cells of Figure 1) increases the percentage of mothers with '16 or more years' of education as well as the percentages of older mothers. Interestingly, the unemployment*Medicaid interaction (lower left cell of Figure 1) acts in the opposite direction, significantly decreasing the percentages of more educated and older blacks. Similarly, among whites, unemployment per se has a significant positive effect on both maternal education (as measured by the

percentage with ’16 or more years’ of schooling) and age. In addition, the percentage of married white women increases when the economy temporarily deteriorates. In all these cases, Medicaid acts to partially offset the unemployment’s effects; i.e., it significantly decreases maternal education, age, and the percentage of married moms. These findings are consistent with the hypothesis that unemployment per se leads to a ‘positive selection into pregnancy’ (only more affluent women becoming pregnant) and that the Medicaid ‘safety net’ mitigates this effect by financially supporting less affluent women.

There are, however, seemingly puzzling patterns in the interacted results as well. First, while unemployment per se significantly increases (and Medicaid decreases) the percentage of white mothers with ’16 or more years’ of schooling, the effect of unemployment (unemployment*Medicaid) on the percentage of white women with ‘less than 12 years’ of education is positive (negative) and significant as well. Notably, however, the statistical significance of the latter effect is lower. Also, the results appear less counter-intuitive when keeping in mind that the percentages of mothers with ‘less than 12 years’, ‘12 to 15 years’, and ‘at least 16 years’ of education have to sum up to 100%. Viewed from this perspective, my results suggest that unemployment decreases (and Medicaid increases) the percentage of mothers with ’12 to 15 years’ of schooling – an economically vulnerable group subject to large business cycle fluctuation in employment and health insurance coverage.

Another puzzling finding is that ‘Medicaid per se’ significantly increases the percentages of married, older, and most educated whites. Since the threshold levels of unemployment (U^) at which the effects of Medicaid switch sign are relatively high (above the national average), these effects may be ‘truly operative’ for at least some of

the counties in my sample. In these cases, Medicaid eligibility expansions far beyond the poverty line may be causing 'positive selection' among whites. Overall, however, my results strongly suggest that unemployment per se increases - and the Medicaid 'safety net' decreases - maternal education, age, and the percentage of married moms.

Conclusion

The goal of this paper is to contribute to our understanding of the effects of unemployment on health-related behaviors and health by studying the specific impacts of unemployment on pregnant women. Explicitly recognizing that, in this population, Medicaid eligibility in times of higher unemployment may serve as a 'safety net', I investigate the interplay of unemployment and Medicaid in affecting prenatal care utilization, infant and maternal health. These relationships have not systematically been investigated in research to date. Also, by including an important overlooked pregnancy outcome -- maternal health -- and by using a more refined measure of unemployment, I add new value to previous work.

My empirical analysis of US data for the 1990's indicates that, overall, higher unemployment at the county level is associated with improved infant health especially among whites and increased prenatal care utilization (and potentially improved maternal health) among blacks. In some cases, both unemployment per se and unemployment interacted with Medicaid eligibility seem to be contributing to the beneficial effects. In others, the Medicaid 'safety net' acts to mitigate, completely offset, or outweigh detrimental effects of unemployment. Interestingly, at least some of these aggregate-level effects are apparently due to changes in the selection of women into pregnancy.

Specifically, unemployment per se increases - and unemployment*Medicaid eligibility decreases – the percentages of highly educated, older, and married mothers. These results are consistent with the role of Medicaid as a 'safety net' for vulnerable, credit constrained populations. In analyses stratified by marital status and education, Medicaid plays the largest role among economically disadvantaged (single and less educated) women. Thus, unemployment may be good for your pregnancy -- provided Medicaid steps in.

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Figure 1. The Effects of an Increase in Unemployment

Change in resources available to women of reproductive age	**Consequence for selection into pregnancy**	**Consequences conditional on becoming pregnant**
Wage income/Fringe benefits ↓	Theory: Fertility ↓ (Becker 1960, Dehejia and Lleras-Muney 2004)	Theory: Prenatal care use ↓, Health ? (Ruhm 2000, Dehejia and Lleras-Muney 2004) Empirical: Effect on health-related behavior weak (Ruhm 2005), Medical problems and activity limitations ↑ (Ruhm 2003)
Leisure (non-work) time ↑	Theory: Fertility ↑ (Becker 1965, Dehejia and Lleras-Muney 2004)	Theory: Prenatal care use ↑ (Becker 1965, Ruhm 2000), Health ? Empirical: Health-related behavior ↑ (Ruhm 2005)
Theory: Medicaid access ? (Cawley and Simon 2005) Empirical: Medicaid access ↑ (Holahan and Garrett 2001, Cawley and Simon 2005)	Theory: Fertility ? (Bitler and Zavodny 2004) Empirical: Fertility ↑ (Bitler and Zavodny 2004)	Theory: Prenatal care use ↑, Health ↑ Empirical: Prenatal care use ↑, Health ↑ (Currie and Grogger 2002, Kutinova and Conway 2005)

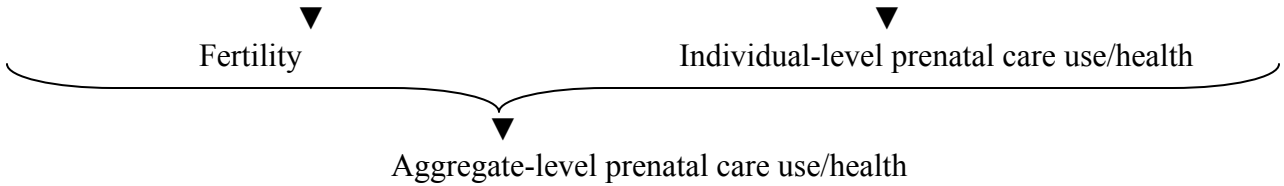
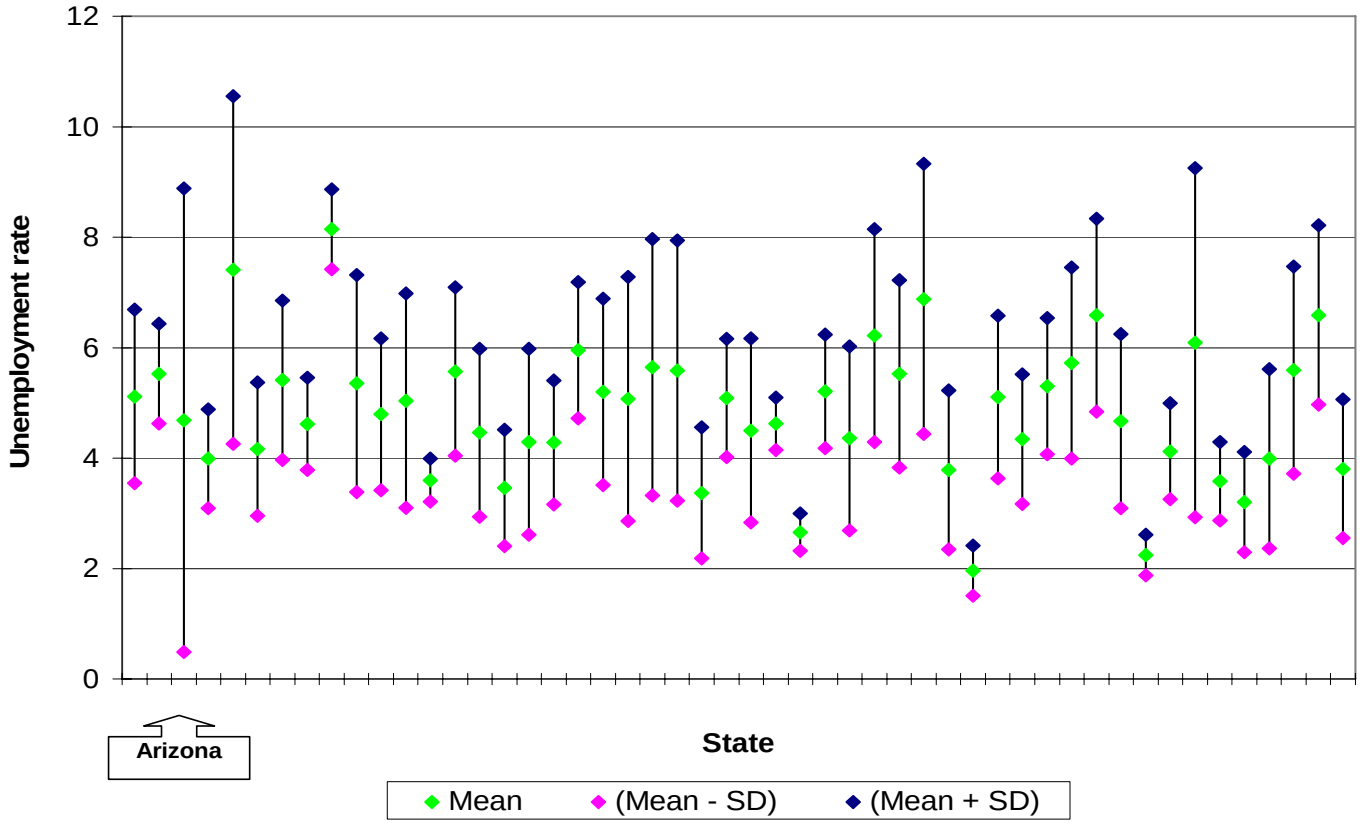


Figure 2. Variation in County-Level Unemployment within and across States, 1991-1999



'Mean' is the state unemployment rate constructed as a weighted average of county unemployment rates. 'SD' is a weighted standard deviation of county unemployment rates within state.

Table 1. Characteristics of Race Cohorts

Percentage or mean	**Black** (3,426 obs.)	**White** (5,125 obs.)
PNC in 1st trimester	70.68	88.30
Adequate/intermediate PNC	87.84	96.79
Low birth weight	9.06	3.73
Very-low birth weight	2.64	0.72
Placental abruption	0.70	0.56
Anemia	3.19	1.43
Hypertension	3.01	3.05 [C]
Any maternal complication	6.64	4.90
30 <= age < 40	26.54	41.55
Age >= 40	1.49	2.11
Less than high school education	18.96	8.59
At least college education	11.54	32.23
Married	36.28	83.72
Unemployment rate – county	5.92	5.34
Unemployment rate – state	5.90	5.80 [A]
Per-capita income (USD)	23,544	23,654 [C]
Medicaid eligibility threshold (% federal poverty line/100)	1.64	1.65 [C]

Unless otherwise noted, all differences between blacks and whites are statistically significant at the 99% confidence level. [A], [B], and [C] indicate significance at the 95%, 90%, and less than 90% confidence level, respectively.

Table 2. The Effects of Unemployment on Prenatal Care Use, Infant and Maternal Health; By Race

	Black	White
Y = f(Unemployment), 1989-1999, county-level		
PNC in 1st trimester	U: 0.537** (0.242)	U: -0.068 (0.078)
Adequate/intermediate PNC	U: 0.390** (0.188)	U: 0.014 (0.033)
Low birth weight	U: -0.041 (0.056)	U: -0.021** (0.008)
Very-low birth weight	U: -0.002 (0.017)	U: -0.008** (0.003)
Placental abruption	U: 0.015 (0.099)	U: 0.010 (0.045)
Anemia	U: -0.466 (1.121)	U: 0.093 (0.282)
Hypertension	U: -0.330 (0.547)	U: 0.001 (0.214)
Any maternal complication	U: -0.765 (1.513)	U: 0.010 (0.373)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, county-level		
PNC in 1st trimester	U: 0.438 (0.450) M: 0.158 (1.448) U*M: 0.050 (0.245)	U: -0.576*** (0.139) M: - 0.713* (0.385) U*M: 0.282*** (0.072) (M^ = 204%FPL, U^ = 2.53)
Adequate/intermediate PNC	U: 0.142 (0.308) M: 0.257 (0.911) U*M: 0.128 (0.184)	U: -0.259*** (0.074) M: -0.285 (0.219) U*M: 0.151*** (0.041) (M^ = 171%FPL)
Low birth weight	U: 0.074 (0.086) M: 0.157 (0.271) U*M: -0.064 (0.054)	U: 0.007 (0.019) M: 0.050 (0.056) U*M: -0.015* (0.009) (M^ = 44%FPL)
Very-low birth weight	U: 0.009 (0.035) M: -0.021 (0.089) U*M: -0.006 (0.019)	U: -0.013* (0.007) M: -0.018 (0.025) U*M: 0.003 (0.004)
Placental abruption	U: -0.041 (0.218) M: -0.406 (0.569) U*M: 0.036 (0.126)	U: 0.201** (0.099) M: 0.151 (0.290) U*M: -0.106** (0.050) (M^ = 191%FPL)
Anemia	U: 0.793 (2.087) M: 3.176 (4.634) U*M: -0.722 (0.978)	U: 0.413 (0.528) M: -0.748 (1.246) U*M: -0.170 (0.233)
Hypertension	U: 0.217 (1.471) M: 2.570 (3.001) U*M: -0.333 (0.695)	U: 0.299 (0.460) M: 0.763 (1.344) U*M: -0.168 (0.221)
Any maternal complication	U: 0.747 (2.907) M: 4.802 (6.208) U*M: -0.883 (1.327)	U: 0.830 (0.757) M: 0.035 (1.989) U*M: -0.449 (0.360)

Estimated with OLS. All models include county and year fixed effects. NDF have been aggregated by race. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the county level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line). U^ indicates a "break-point" level of the unemployment rate.

Table 3. Characteristics of Race Cohorts; State-Level Cells

Proportion or mean	**Black** (504 obs.)	**White** (597 obs.)
PNC in 1st trimester	70.05	87.04
Adequate/intermediate PNC	88.02	96.58
Low birth weight	9.00	3.86
Very-low birth weight	2.58	0.73
Placental abruption	0.71	0.59
Anemia	3.32	1.51
Hypertension	3.15	3.37
Any maternal complication	6.91	5.32
30 <= age < 40	25.33	37.45
Age >= 40	1.42	1.86
Less than high school education	19.29	10.22
At least college education	10.66	27.96
Married	36.31	83.28
Unemployment rate – state	5.86	5.69 [C]
Medicaid eligibility threshold (% federal poverty line/100)	1.63	1.62 [C]

Unless otherwise noted, all differences between blacks and whites are statistically significant at the 99% confidence level. [A], [B], and [C] indicate significance at the 95%, 90%, and less than 90% confidence level, respectively.

Table 4. The Effects of Unemployment on Prenatal Care Use, Infant and Maternal Health; By Race; State-Level Unemployment

	Black	White
Y = f(Unemployment), 1989-1999, county-level		
PNC in 1st trimester	U: 0.756** (0.317)	U: -0.059 (0.107)
Adequate/intermediate PNC	U: 0.481* (0.251)	U: 0.015 (0.042)
Low birth weight	U: -0.060 (0.073)	U: -0.036*** (0.011)
Very-low birth weight	U: -0.009 (0.023)	U: -0.009** (0.004)
Placental abruption	U: -0.150 (0.114)	U: 0.063 (0.067)
Anemia	U: -1.418 (1.552)	U: 0.114 (0.325)
Hypertension	U: -0.415 (0.728)	U: 0.033 (0.259)
Any maternal complication	U: -1.926 (2.128)	U: 0.098 (0.439)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, county-level		
PNC in 1st trimester	U: 0.555 (0.805)	U: -0.913*** (0.220)
	M: -0.193 (2.278)	M: -1.939*** (0.647)
	U*M: 0.110 (0.420)	U*M: 0.490*** (0.121)
		(M^ = 186%FPL)
Adequate/intermediate PNC	U: 0.012 (0.620)	U: -0.434*** (0.135)
	M: -0.466 (1.611)	M: -0.915** (0.393)
	U*M: 0.258 (0.308)	U*M: 0.257*** (0.072)
		(M^ = 169%FPL)
Low birth weight	U: 0.047 (0.114)	U: 0.003 (0.034)
	M: 0.167 (0.393)	M: 0.098 (0.100)
	U*M: -0.060 (0.080)	U*M: -0.022 (0.018)
Very-low birth weight	U: -0.020 (0.056)	U: -0.024* (0.013)
	M: -0.084 (0.140)	M: -0.052 (0.043)
	U*M: 0.008 (0.027)	U*M: 0.009 (0.008)
Placental abruption	U: -0.036 (0.385)	U: 0.400** (0.179)
	M: 0.147 (1.123)	M: 0.648 (0.543)
	U*M: -0.063 (0.228)	U*M: -0.192* (0.098)
		(M^ = 208%FPL)
Anemia	U: -2.199 (3.309)	U: -0.820 (0.919)
	M: -2.150 (9.516)	M: -4.436* (2.465)
	U*M: 0.462 (1.821)	U*M: 0.562 (0.508)
Hypertension	U: 0.456 (1.955)	U: 0.241 (0.897)
	M: 3.902 (4.874)	M: 0.604 (2.649)
	U*M: -0.551 (0.981)	U*M: -0.121 (0.472)
Any maternal complication	U: -2.115 (4.357)	U: -0.147 (1.412)
	M: 0.766 (12.093)	M: -2.907 (3.984)
	U*M: 0.081 (2.306)	U*M: 0.166 (0.763)

Estimated with OLS. All models include county and year fixed effects. NDF have been aggregated by race. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the county level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line).

Table 5. The Effects of Unemployment on Prenatal Care Use, Infant and Maternal Health; By Race; State-Level Unemployment and Cells

	Black	White
Y = f(Unemployment), 1989-1999, state-level		
PNC in 1st trimester	U: 0.730* (0.395)	U: -0.083 (0.147)
Adequate/intermediate PNC	U: 0.472* (0.254)	U: 0.018 (0.062)
Low birth weight	U: -0.055 (0.090)	U: -0.035*** (0.013)
Very-low birth weight	U: -0.010 (0.032)	U: -0.011*** (0.004)
Placental abruption	U: -0.106 (0.107)	U: 0.070 (0.064)
Anemia	U: -1.451 (1.561)	U: 0.236 (0.275)
Hypertension	U: -0.480 (0.786)	U: -0.035 (0.380)
Any maternal complication	U: -1.968 (2.142)	U: 0.192 (0.372)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, state-level		
PNC in 1st trimester	U: 0.506 (0.964)	U: -0.878** (0.355)
	M: 0.111 (2.808)	M: -1.723* (1.018)
	U*M: 0.114 (0.497)	U*M: 0.463** (0.188)
		(M^ = 189%FPL)
Adequate/intermediate PNC	U: -0.134 (0.671)	U: -0.443** (0.191)
	M: -0.825 (1.878)	M: -1.008* (0.532)
	U*M: 0.339 (0.357)	U*M: 0.269** (0.100)
		(M^ = 165%FPL)
Low birth weight	U: 0.059 (0.162)	U: 0.016 (0.047)
	M: 0.145 (0.550)	M: 0.149 (0.154)
	U*M: -0.063 (0.113)	U*M: -0.030 (0.027)
Very-low birth weight	U: -0.020 (0.074)	U: -0.018 (0.015)
	M: -0.126 (0.198)	M: -0.038 (0.045)
	U*M: 0.009 (0.037)	U*M: 0.005 (0.009)
Placental abruption	U: 0.132 (0.412)	U: 0.307 (0.194)
	M: 0.534 (1.195)	M: 0.529 (0.640)
	U*M: -0.139 (0.243)	U*M: -0.138 (0.117)
Anemia	U: -2.541 (3.512)	U: -0.578 (1.046)
	M: -3.846 (9.679)	M: -4.076 (2.648)
	U*M: 0.676 (1.929)	U*M: 0.508 (0.575)
Hypertension	U: 0.591 (2.013)	U: 0.361 (1.232)
	M: 3.617 (5.361)	M: 0.756 (3.895)
	U*M: -0.659 (1.033)	U*M: -0.229 (0.679)
Any maternal complication	U: -2.114 (4.565)	U: 0.115 (1.516)
	M: -0.738 (12.928)	M: -2.495 (4.597)
	U*M: 0.097 (2.491)	U*M: 0.079 (0.867)

Estimated with OLS. All models include state and year fixed effects. NDF have been aggregated by race. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the state level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line).

Table 6. Characteristics of Race/Marital Status Cohorts

Percentage or mean	**Single Black** (3,002 obs.)	**Married Black** (2,554 obs.)	**Single White** (4,864 obs.)	**Married White** (5,123 obs.)
PNC in 1st trimester	64.36	81.72	72.72	91.31
Adequate/intermediate PNC	84.22	94.06	91.16	97.87
Low birth weight	10.28	6.94	6.00	3.29
Very-low birth weight	2.86	2.28	1.23	0.62
Placental abruption	0.75	0.60	0.73	0.53
Anemia	3.36	2.81	1.92	1.33
Hypertension	2.86	3.23	3.07	3.05 [C]
Any maternal complication	6.71	6.40	5.55	4.77
30 <= age < 40	18.84	40.26	19.94	45.75
Age >= 40	1.01	2.36	1.47	2.23
Less than high school education	25.06	8.33	24.22	5.57
At least college education	4.83	23.39	7.56	37.00
Unemployment rate – county	6.03	5.76	5.55	5.30
Unemployment rate – state	5.91	5.91 [C]	5.80	5.80 [C]
Per-capita income (USD)	23,516	23,694 [C]	23,091	23,767
Medicaid eligibility threshold (% federal poverty line/100)	1.64	1.65 [C]	1.67	1.64 [A]

Unless otherwise noted, all differences between single and married women within a racial cohort are statistically significant at the 99% confidence level. [A], [B], and [C] indicate significance at the 95%, 90%, and less than 90% confidence level, respectively.

Table 7. The Effects of Unemployment on Prenatal Care Use, Infant and Maternal Health; By Race and Marital Status

	Single Black	Married Black	Single White	Married White
Y = f(Unemployment), 1989-1999, county-level				
PNC in 1st trimester	U: 0.690* (0.350)	U: 0.130 (0.180)	U: -0.522*** (0.141)	U: -0.070 (0.077)
Adequate/intermediate PNC	U: 0.507* (0.271)	U: 0.115 (0.114)	U: -0.147* (0.077)	U: 0.012 (0.030)
Low birth weight	U: -0.054 (0.071)	U: -0.006 (0.042)	U: -0.018 (0.031)	U: -0.009 (0.008)
Very-low birth weight	U: -0.008 (0.027)	U: 0.017 (0.022)	U: -0.027* (0.015)	U: -0.002 (0.004)
Placental abruption	U: -0.011 (0.107)	U: 0.051 (0.132)	U: -0.014 (0.088)	U: 0.018 (0.045)
Anemia	U: -0.224 (1.308)	U: -0.963 (0.954)	U: 0.011 (0.399)	U: 0.132 (0.283)
Hypertension	U: -0.454 (0.623)	U: -0.055 (0.541)	U: -0.221 (0.277)	U: 0.028 (0.222)
Any maternal complication	U: -0.665 (1.755)	U: -0.960 (1.329)	U: -0.275 (0.546)	U: 0.074 (0.368)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, county-level				
PNC in 1st trimester	U: 0.893 (0.608) M: 0.886 (2.088) U*M: -0.122 (0.339)	U: -0.064 (0.325) M: -0.258 (0.844) U*M: 0.110 (0.171)	U: -1.060*** (0.257) M: -0.606 (0.685) U*M: 0.291** (0.127) (M^=364%FPL)	U: -0.537*** (0.127) M: -0.735** (0.354) U*M: 0.261*** (0.065) (M^=206%FPL, U^=2.81)
Adequate/intermediate PNC	U: 0.492 (0.420) M: 1.021 (1.334) U*M: -0.010 (0.251)	U: -0.184 (0.194) M: -0.264 (0.479) U*M: 0.167* (0.098) (M^=110%FPL)	U: -0.611*** (0.171) M: -0.055 (0.500) U*M: 0.249*** (0.091) (M^=246%FPL)	U: -0.201*** (0.062) M: -0.282 (0.183) U*M: 0.119*** (0.033) (M^=170%FPL)
Low birth weight	U: 0.052 (0.113) M: 0.189 (0.314) U*M: -0.059 (0.060)	U: 0.104 (0.097) M: 0.076 (0.291) U*M: -0.061 (0.058)	U: 0.072 (0.056) M: 0.194 (0.146) U*M: -0.049** (0.023) (M^=147%FPL)	U: 0.010 (0.017) M: 0.049 (0.049) U*M: -0.011 (0.009)
Very-low birth weight	U: 0.016 (0.059) M: -0.042 (0.148) U*M: -0.011 (0.030)	U: -0.046 (0.050) M: -0.108 (0.136) U*M: 0.036 (0.024)	U: 0.013 (0.028) M: -0.002 (0.085) U*M: -0.021 (0.015)	U: -0.017** (0.007) M: -0.019 (0.022) U*M: 0.008** (0.004) (M^=206%FPL)
Placental abruption	U: -0.196 (0.276) M: -0.837 (0.672) U*M: 0.112 (0.157)	U: 0.181 (0.268) M: 0.206 (0.741) U*M: -0.074 (0.150)	U: 0.126 (0.211) M: -0.295 (0.579) U*M: -0.074 (0.103)	U: 0.218** (0.101) M: 0.235 (0.293) U*M: -0.111** (0.051) (M^=196%FPL)
Anemia	U: 2.153 (2.452) M: 5.527 (5.348) U*M: -1.348 (1.137)	U: -1.617 (1.945) M: -1.171 (4.513) U*M: 0.373 (0.964)	U: 1.377* (0.822) M: 0.896 (1.834) U*M: -0.735** (0.329) (M^=187%FPL)	U: 0.157 (0.518) M: -1.258 (1.255) U*M: -0.005 (0.236)
Hypertension	U: 0.287 (1.813) M: 2.700 (3.712) U*M: -0.438 (0.872)	U: 0.274 (1.235) M: 2.316 (2.672) U*M: -0.211 (0.561)	U: 0.421 (0.668) M: 2.689 (1.810) U*M: -0.356 (0.318)	U: 0.215 (0.457) M: 0.279 (1.337) U*M: -0.105 (0.220)
Any maternal complication	U: 1.874 (3.525) M: 6.644 (7.498) U*M: -1.452 (1.619)	U: -1.114 (2.473) M: 1.170 (5.356) U*M: 0.069 (1.155)	U: 1.814 (1.198) M: 3.211 (3.026) U*M: -1.133** (0.550) (M^=160%FPL)	U: 0.524 (0.735) M: -0.859 (1.923) U*M: -0.241 (0.352)

Estimated with OLS. All models include county and year fixed effects. NDF have been aggregated by race and marital status. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the county level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line). U^ indicates a "break-point" level of the unemployment rate.

Table 8. Characteristics of Race/Education Cohorts

Percentage or mean	**Black Edu <12** (1,630 obs.)	**Black Edu 12-15** (3,179 obs.)	**Black Edu 16+** (1,244 obs.)	**White Edu <12** (3,987 obs.)	**White Edu 12-15** (5,121 obs.)	**White Edu 16+** (4,988 obs.)
PNC in 1st trimester	56.58	71.82	88.40	69.18	87.31	95.33
Adequate/intermediate PNC	77.03	89.48	96.60	89.02	96.79	98.91
Low birth weight	12.03	8.66	6.45	6.41	3.85	2.76
Very-low birth weight	2.78	2.57	2.36	1.10	0.75	0.52
Placental abruption	0.82	0.67	0.57	0.77	0.57	0.47
Anemia	3.51	3.13	2.49	2.01	1.47	1.21
Hypertension	2.19	3.09	3.74	2.29	3.24	2.91
Any maternal complication	6.28	6.63	6.56 [C]	4.91	5.13	4.46
30 <= age < 40	17.96	24.65	52.56	15.77	34.60	61.23
Age >= 40	1.18	1.27	3.42	0.86	1.55	3.44
Married	15.64	35.83	72.89	54.43	81.34	96.22
Unemployment rate – county	6.27	5.92	5.59	5.72	5.46	5.03
Unemployment rate – state	6.01 [B]	5.92	5.80 [B]	5.91 [B]	5.84	5.73
Per-capita income (USD)	23,266 [C]	23,375	25,423	21,713	22,885	25,531
Medicaid eligibility threshold (% federal poverty line/100)	1.63 [C]	1.64	1.70	1.60 [A]	1.63	1.68

Unless otherwise noted, all differences compared to women with '12 to 15 years' of education within the same racial cohort are statistically significant at the 99% confidence level. [A], [B], and [C] indicate significance at the 95%, 90%, and less than 90% confidence level, respectively.

Table 9. The Effects of Unemployment on Prenatal Care Use, Infant and Maternal Health; By Race and Education

	Black Edu <12	Black Edu 12-15	Black Edu 16+	White Edu <12	White Edu 12-15	White Edu 16+
Y = f(Unemployment), 1989-1999, county-level						
PNC in 1st trimester	U: 1.145** (0.476)	U: 0.526** (0.232)	U: 0.030 (0.145)	U: -0.342** (0.155)	U: -0.028 (0.083)	U: -0.012 (0.056)
Adequate/intermediate PNC	U: 0.942** (0.389)	U: 0.334* (0.175)	U: -0.070 (0.095)	U: 0.006 (0.093)	U: 0.026 (0.034)	U: -0.012 (0.025)
Low birth weight	U: -0.048 (0.109)	U: -0.063 (0.051)	U: 0.032 (0.053)	U: -0.046 (0.035)	U: -0.017* (0.010)	U: -0.021* (0.012)
Very-low birth weight	U: -0.009 (0.044)	U: -0.004 (0.017)	U: 0.029 (0.034)	U: 0.003 (0.014)	U: -0.011*** (0.004)	U: -0.000 (0.005)
Placental abruption	U: 0.129 (0.179)	U: -0.023 (0.104)	U: 0.102 (0.268)	U: -0.099 (0.114)	U: 0.027 (0.048)	U: 0.042 (0.064)
Anemia	U: 0.402 (1.388)	U: -0.510 (1.147)	U: -1.921 (1.548)	U: -0.039 (0.457)	U: 0.012 (0.255)	U: 0.325 (0.423)
Hypertension	U: -0.217 (0.671)	U: -0.359 (0.519)	U: 0.254 (1.250)	U: -0.081 (0.295)	U: 0.045 (0.222)	U: 0.098 (0.258)
Any maternal complication	U: 0.350 (1.839)	U: -0.885 (1.504)	U: -1.509 (2.316)	U: -0.285 (0.585)	U: 0.003 (0.371)	U: 0.314 (0.503)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, county-level						
PNC in 1st trimester	U: 0.948 (0.886) M: -0.515 (3.104) U*M: 0.113 (0.485)	U: 0.441 (0.398) M: 0.352 (1.348) U*M: 0.040 (0.219)	U: -0.200 (0.461) M: -0.160 (0.967) U*M: 0.127 (0.242)	U: -0.635* (0.342) M: 0.113 (1.108) U*M: 0.157 (0.171)	U: -0.466*** (0.144) M: -0.558 (0.407) U*M: 0.243*** (0.074) (M^ = 192)	U: -0.202** (0.092) M: -0.211 (0.223) U*M: 0.105** (0.043) (M^ = 191)
Adequate/intermediate PNC	U: 0.595 (0.672) M: 0.720 (2.107) U*M: 0.168 (0.377)	U: 0.122 (0.249) M: 0.319 (0.749) U*M: 0.108 (0.143)	U: -0.360 (0.254) M: -0.485 (0.559) U*M: 0.162 (0.134)	U: -0.371* (0.217) M: 0.369 (0.762) U*M: 0.200* (0.121) (M^ = 185)	U: -0.177** (0.071) M: -0.110 (0.216) U*M: 0.111*** (0.038) (M^ = 159)	U: -0.094* (0.049) M: -0.149 (0.145) U*M: 0.046* (0.024) (M^ = 204)
Low birth weight	U: -0.115 (0.222) M: -0.298 (0.548) U*M: 0.041 (0.105)	U: 0.116 (0.090) M: 0.302 (0.297) U*M: -0.100* (0.059) (M^ = 116)	U: 0.003 (0.163) M: -0.279 (0.346) U*M: 0.018 (0.081)	U: 0.091 (0.072) M: 0.299 (0.252) U*M: -0.076** (0.035) (M^ = 120)	U: -0.003 (0.025) M: 0.009 (0.075) U*M: -0.008 (0.012)	U: 0.013 (0.031) M: 0.116 (0.073) U*M: -0.019 (0.016)
Very-low birth weight	U: 0.054 (0.089) M: -0.023 (0.217) U*M: -0.032 (0.043)	U: 0.001 (0.034) M: -0.032 (0.099) U*M: -0.002 (0.018)	U: -0.013 (0.111) M: -0.173 (0.254) U*M: 0.025 (0.060)	U: 0.001 (0.027) M: -0.110 (0.086) U*M: 0.002 (0.015)	U: -0.007 (0.010) M: 0.002 (0.032) U*M: -0.002 (0.005)	U: -0.006 (0.011) M: 0.017 (0.031) U*M: 0.003 (0.006)
Placental abruption	U: 1.019* (0.537) M: 1.622 (1.225) U*M: -0.497* (0.293) (M^ = 205)	U: -0.182 (0.234) M: -0.476 (0.627) U*M: 0.092 (0.122)	U: 0.591 (0.426) M: 0.290 (1.099) U*M: -0.268 (0258)	U: 0.210 (0.251) M: -0.198 (0.763) U*M: -0.165 (0.123)	U: 0.187* (0.108) M: 0.035 (0.309) U*M: -0.087 (0.053)	U: 0.263* (0.140) M: 0.422 (0.367) U*M: -0.124* (0.071) (M^ = 212)
Anemia	U: 5.625 (3.820) M: 13.247 (10.003) U*M: -2.989 (2.025)	U: 0.243 (2.013) M: 1.379 (4.402) U*M: -0.424 (0.930)	U: -3.934 (3.183) M: -1.961 (6.238) U*M: 1.112 (1.478)	U: 1.418 (1.232) M: 1.028 (2.900) U*M: -0.791 (0.547)	U: 0.497 (0.499) M: -0.389 (1.260) U*M: -0.262 (0.221)	U: -0.188 (0.663) M: -2.146 (1.388) U*M: 0.294 (0.308)
Hypertension	U: 1.443 (2.353) M: 4.583 (4.942) U*M: -0.957 (1.167)	U: 0.082 (1.487) M: 2.418 (3.114) U*M: -0.274 (0.709)	U: -1.067 (2.360) M: -2.160 (4.687) U*M: 0.738 (1.035)	U: 0.949 (0.719) M: 1.930 (1.932) U*M: -0.567* (0.318) (M^ = 167)	U: 0.596 (0.475) M: 0.877 (1.465) U*M: -0.306 (0.229)	U: 0.058 (0.578) M: 1.122 (1.504) U*M: 0.015 (0.296)
Any maternal complication	U: 7.411 (5.050) M: 17.656 (12.292) U*M: -4.036 (2.576)	U: -0.031 (2.835) M: 3.008 (6.048) U*M: -0.504 (1.280)	U: -4.040 (4.498) M: -3.786 (8.507) U*M: 1.411 (1.960)	U: 2.488 (1.570) M: 2.735 (4.106) U*M: -1.510** (0.717) (M^ = 165)	U: 1.162 (0.761) M: 0.293 (2.121) U*M: -0.634* (0.361) (M^ = 183)	U: 0.063 (0.906) M: -0.650 (1.993) U*M: 0.141 (0.451)

Notes to Table 9:
Estimated with OLS. All models include county and year fixed effects. NDF have been aggregated by race and education. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the county level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line).

Table 10. The Effects of Unemployment on Cohort Characteristics; By Race

	Black	White
Y = f(Unemployment), 1989-1999, county-level		
Less than high school education	U: 0.082 (0.091)	U: -0.006 (0.031)
At least college education	U: 0.037 (0.056)	U: -0.002 (0.072)
Married	U: 0.425** (0.216)	U: 0.310*** (0.083)
30 <= age < 40	U: 0.395*** (0.085)	U: 0.093 (0.070)
Age >= 40	U: 0.044*** (0.012)	U: 0.055*** (0.019)
Y = f(Unemployment, Medicaid, Unemployment*Medicaid), 1989-1999, county-level		
Less than high school education	U: -0.066 (0.205) M: -0.207 (0.619) U*M: 0.082 (0.121)	U: 0.220** (0.090) M: 0.371 (0.269) U*M: -0.126** (0.053) (M^ = 175%FPL)
At least college education	U: 0.671*** (0.167) M: 1.545*** (0.469) U*M: -0.362*** (0.091) (M^ = 185%FPL, U^ = 4.26)	U: 0.929*** (0.158) M: 2.953*** (0.501) U*M: -0.528*** (0.856) (M^ = 176%FPL, U^ = 5.59)
Married	U: 0.610 (0.378) M: 0.822 (1.058) U*M: -0.112 (0.227)	U: 0.813*** (0.172) M: 1.914*** (0.522) U*M: -0.287*** (0.095) (M^ = 283%FPL, U^ = 6.66)
30 <= age < 40	U: 1.174*** (0.263) M: 2.235** (0.985) U*M: -0.451*** (0.147) (M^ = 260%FPL, U^ = 4.96)	U: 1.005*** (0.158) M: 2.832*** (0.532) U*M: -0.517*** (0.088) (M^ = 194%FPL, U^ = 5.48)
Age >= 40	U: 0.085*** (0.032) M: 0.099 (0.122) U*M: -.024 (0.019)	U: 0.147*** (0.030) M: 0.361*** (0.110) U*M: -0.053*** (0.020) (M^ = 277%FPL, U^ = 6.80)

Estimated with OLS. All models include county and year fixed effects. NDF have been aggregated by race. Observations are weighted by the number of births. SEs (in parentheses) have been corrected for heteroskedasticity and clustering at the county level. *, **, and *** denote statistical significance at the 90%, 95%, and 99% confidence levels, respectively. U is the unemployment rate and M the Medicaid eligibility threshold. M^ indicates a "break-point" level of Medicaid eligibility (as a percent of the federal poverty line). U^ indicates a "break-point" level of the unemployment rate.