Racially-charged Events, Stress, and Birth Outcomes

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WORKING DRAFT

Abstract

Police killings of Black Americans are increasingly being met with significant media coverage and public response, including civil unrest. Given the frequency with which these events occur, it is vital to understand both their direct and indirect impacts. Using national birth certificate data and an event study design, I test for the impact of high-profile police-involved killings of Black Americans on racial disparities in maternal stress levels and birth outcomes. I find a large, statistically significant, and persistent increase in gestational hypertension of Black mothers relative to White mothers, strongly indicating an increase in the racial gap in maternal stress following these high-profile killings. I find limited evidence of an accompanying effect on the racial gap in birth outcomes. However, many existing papers similarly find no impacts of maternal stress on birth outcomes while simultaneously finding significant impact on later-life outcomes, leaving room for additional future work based on these findings.

1 Introduction

The racial gap in birth outcomes in the United States is stark and persistent. Relative to white infants, black infants have more than twice the mortality rate, about twice the rate of low birth weight and pre-term birth, and about three times the rate of very low birth weight and very preterm births (Lu et al. 2010). Furthermore, this gap has shown few if any signs of closing, exemplified by the fact that the black infant mortality rate has been roughly double the white infant mortality rate for over 35 years (Smith et al. 2018).

Additionally, a growing literature documents a relationship between maternal stress during pregnancy and worsened birth outcomes. Specifically, stress is often associated with lower birth weight and a shortened gestation period.

This paper unites the aforementioned facts by estimating the impact of police-involved killings of Black Americans and the ensuing civil unrest and heightened media coverage on the racial gap in maternal stress and birth outcomes in the United States. I use an event study design to test for impacts under the assumption of parallel trends, i.e. that maternal stress and birth outcomes among White and Black mothers would have followed similar trends in the absence of the killings.

In the absence of the availability of superior measures of stress, such as cortisol levels, I use gestational hypertension as my primary measure of maternal stress. I find that the racial gap in maternal stress first increases by about 0.6 percentage points 6 months after the month of a killing, and in every month thereafter, the impact persists in a range between 1.2 percentage point and 1.7 percentage points. With a pre-killing racial gap in gestational hypertension of around 1.5 percentage points, these effect sizes are large.

I also estimate the impact on birth weight, gestation length, incidence of low birth weight and incidence of pre-term birth. I find limited evidence of an increase in the racial gaps in gestation length and pre-term birth, with statistically significant estimates ranging from -0.057 to -0.083 weeks of gestation in months 11, 12, and 15 and of statistically significant estimates ranging from 0.96 to 1.32 percentage points on the probability of a pre-term birth in months 11, 12, 13, and 15 following a killing. There is, however, no corresponding impact on birth weight outcomes.

Finally, as an attempt to disentangle the impact of a police-involved killing from the impact of the ensuing reaction by the media and citizenry, I estimate the same event study model using a sample of the highest-profile killings and a sample of the lowest-profile killings.

Estimates from these samples suggest an important role of the coverage and spread of these stories in augmenting the magnitude of maternal stress effects, as the high-profile sample exhibits larger maternal stress effects and the low-profile sample exhibits smaller maternal stress effects when compared to the primary sample.

2 Literature Review

There is an active literature documenting the relationship between maternal stress during pregnancy and birth outcomes. Multiple studies have estimated the causal relation using natural disasters as an instrument for stress (Torche 2011; Parayiwa and Behie 2018; Menclova and Stillman 2020). Each of these studies finds that stress decreases birth weight, gestation length, or both. Camacho (2008) finds similar results using terrorist attacks in Colombia as an instrument. The current study adds to this literature by using a novel instrument and studying impacts on racial gaps rather than population-wide effects.

The negative effects of maternal stress during pregnancy appear to remain long term. Aizer et al. (2016) use sibling comparisons to show that in-utero exposure to stress worsens cognition, health, and educational attainment. Using death of a maternal relative as an instrument for stress, Persson and Rossin-Slater (2018) find evidence that elevated maternal stress results in worse mental health outcomes for children. While Berthelon et al. (2018) do not find birth weight effects, they do find negative effects on development, cognition skills, and attention problems. These findings are especially important to the current study, given that (1) longer-term outcomes are ultimately what is most economically impactful and (2) a sizable racial gap exists in these longer-term outcomes as well.

While the findings are not necessarily causal, research into the association of stress and birth outcomes finds that some of the aforementioned racial gap in birth outcomes can be explained by differential stress levels across race (Dominguez et al. 2008; Almeida et al. 2018). Pascoe and Smart Richman (2009) provide a review of a rich literature exploring the relationship between perceived discrimination and health outcomes, including through the mechanism of stress. If police-involved killings heighten feelings of perceived discrimination, this could be one such mechanism through which results arise.

Most similar to the current paper's design is a paper that estimates the impact of local police killings on educational performance and well-being, finding that black and Hispanic students experience decreased GPA, increased emotional disturbance, and lower rates of high school completion and college enrollment (Ang 2021). A similar study found that recent local shootings account for large decreases in performance on reading and vocabulary assessments (Sharkey 2010). The current study differs notably from these in its population of interest, as these studies both focused on school-age children; the current study also differs in the scope, as these studies are focused on the effects of events on local individuals while the current study estimates the impact among all births within the state of the killing.

In contrast, Currie et al. (2018) focus on in-utero impacts of violence, finding that an assault in a mother's home during the third trimester increases the incidence of very low birth weight births and very pre-term births. My study differs from this study by estimating the impact of violence that occurs potentially far from the mother's home but of which many mothers are aware.

3 Background

3.1 Killing of Michael Brown

On August 9, 2014, the unarmed Michael Brown was shot six times and killed by Officer Darren Wilson in Ferguson, Missouri. Accounts of the particular details of the shooting differ. A witness claims that Brown turned to face the officer with his hands raised before the shooting occurred, while Wilson claims that Brown charged the officer and that the shots were fired in self-defense.

Believing that the shooting was racially motivated, residents of Ferguson gathered the following day in protest to call for charges against Wilson. In many cases, these protests led to looting and vandalization. Demonstrations, both peaceful and violent, continued throughout the ensuing months and increased in magnitude on November 24, when it was announced that a grand jury had decided not to indict Wilson in Brown's killing.

Throughout the months of protests, law enforcement responded forcefully, at various times employing riot gear, smoke bombs, flash grenades, and rubber bullets. The National Guard was also deployed in Ferguson from August 18 to August 21 and again from November 17 to December 2.

Brown's killing and the subsequent unrest in Ferguson were covered extensively by local and national media, and the case was nearly universally known by the time that the unrest was subsiding. For example, in a national poll conducted December 3-7, 2014, 94 percent of respondents reported knowing at least "a little" about the grand jury decision not to indict, with 75 percent reporting to know "a lot" (Pew Research Center 2014). The killing is also widely credited with catalyzing the emergence of the Black Lives Matter Movement (Hafner 2016).

While I cannot clearly identify the impact of the shooting on stress levels, I can proxy for the degree to which the shooting was on people's minds using Google Trends data. Figure 1 illustrates these data, with Panel A illustrating a long horizon and Panel B illustrating the year 2014. This figure shows that search volume was high and sustained for about three weeks following the shooting before falling to low levels until the announcement of the grand jury's decision not to indict Officer Wilson on November 24th, when search volume briefly spiked for about a week before gradually returning to low levels again.

3.2 Similar Subsequent Cases

Since Michael Brown's death, there have been a number of deaths of black Americans at the hands of police which have led to similar instances of civil unrest in cities throughout the United States as well as nationwide. A partial list of the most publicized deaths includes

Tamir Rice, Walter Scott, Alton Sterling, Philando Castile, Stephon Clark, Breonna Taylor, and George Floyd.

A period of particularly widespread protests and unrest began nationwide in response to the deaths of Taylor and Floyd, which occurred within 3 months of each other in 2020. By July 3, 2020, only about a month after protests had begun, polls estimated between 15 million and 26 million people in the country had participated in some demonstration in response to the deaths (Buchanan et al. 2020).

The frequency at which these incidents continue to occur, along with the increasing intensity of the backlash underscore the need to understand both the direct and indirect consequences of these killings.

4 Data

I use restricted-use birth certificate data from the National Vital Statistics System published by the National Center for Health Statistics. These data include information on all births in the United States. The data include birth outcomes such as gestation length, birth weight, and APGAR score. Also included are baseline variables such as maternal age, maternal marital status, maternal education, pre-pregnancy BMI and weight, month of initial prenatal care, number of prenatal visits, and health indicators prior to and during pregnancy. Additionally, the data include geographic information on the county in which births occur.

4.1 Estimation Sample Restrictions

While there are hundreds of police-involved killings of black individuals that have occurred since the killing of Michael Brown, the interest of the current paper lies in the most high-profile examples. As a first step toward narrowing the list of killings down to the most relevant events, I use the list of killings from the "65 Stories" exhibit of the *Say Their Names - No More Names* exhibit, which the exhibit creator describes as the "more well-known names of victims," most of whom were killed by police officers who were on-duty (Smith 2020).

From these 65 events, I remove any events that occurred prior to the killing of Michael Brown, as I am only interested in the killing that occur in the post-Black Lives Matter era. I also remove some events that occurred in late 2018 or later, as the time horizon of available outcome data is too limited for these events. I next find the peak Internet search volume of each victim's first and last name using Google Trends data and limit to the twelve events with the highest peak search volume. After these restrictions, the events that I include in my analysis are the killings of Eric Garner, Akai Gurley, Michael Brown, Laquan McDonald, Tamir Rice, Walter Scott, Freddie Gray, Alton Sterling, Philando Castile, Terence Crutcher, Stephon Clark, and Botham Jean.

A birth must meet two restrictions with respect to one of the events above in order to be included in the estimation sample. First, the birth must occur in the same state as the killing. Second, the birth must occur in the time period ranging from 9 months prior to the killing to 15 months after the killing.

Finally, since the focus of this paper is the black-white racial gap in maternal stress and birth outcomes, I include only births to white and black mothers in the estimation sample.

These restrictions result in an estimation sample of 3,300,488 births, of which 572,898 are to black mothers and 2,727,590 are to white mothers.

5 Empirical Model

I use an event study design to estimate the differential impact of a killing and subsequent response on birth outcomes by race. That is, I estimate the following equation:

$$Y_{ims} = \alpha + \beta_1 Black_i + \sum_m \beta_2^m \times I_m \times Black_i + \gamma_s + X_i + \epsilon_{im} \quad (1)$$

Y_{ims} is an outcome for child i born in month m in the location and time period associated with killing s; each I_m is an indicator variable for the birth occurring in month m; $Black_i$ is an indicator variable for the race of the mother of child i being Black; γ_s are fixed effects for a killing; and X_i is a vector of control variables. The coefficients of interest are the values of β_2^m for all values of m.

The event study design allows me to identify different effects on births to mothers who were at different stages of their pregnancy at the time of a killing, ranging from mothers approaching the end of their pregnancy all the way to mothers who conceived after the killing occurred.

Validity of this design rests on the parallel trends assumption–that is, the assumption that outcomes for white and black mothers would have moved in the same direction by approximately the same amount if a killing had not occurred. While the lack of data in the counterfactual scenario of no killing prevents testing the parallel trends assumption fully, I test for parallel trends in the nine months prior to a killing as a best alternative.

6 Results

6.1 Primary Event Study Results

I first estimate the impact of the killings on the racial gap in gestational hypertension. While gestational hypertension is not as ideal a measure of stress as something like cortisol levels, it is closely associated with maternal stress and provides the best measure of stress among measures available in the birth certificate data. Estimates are illustrated in Figure 2.[1] Panel A plots the mean incidence of gestational hypertension by race, and Panel B plots the coefficients and confidence intervals of the estimates of β_2^m from Equation 1 for $-9 \leq m \leq 15$.

Estimates are small and not statistically significant for the first five months following a killing. However, every estimate thereafter is positive and statistically significant, with an

[1] Note that I refer to Figures for results throughout this paper. This is because the tables for these results are large and difficult to read while showing the same set of information as the figures. Tables are also shown below figures.

initial increase to 0.65 percentage points in month six and a further jump in month seven to 1.17 percentage points which is subsequently sustained as estimates in months 7-16 range from 1.17 to 1.66 percentage points.

This pattern of event study estimates suggest that the racial gap in maternal stress for mothers who were in their second and third trimesters of pregnancy at the time of a killing was unaffected by the killings but that the racial gap in maternal stress was magnified among mothers in their first trimester of pregnancy at the time of a killing and mothers who conceived in the months following a killing. Furthermore, the effect on the racial gap in maternal stress among those later births is large, as the racial gap in the incidence of gestational hypertension prior to a killing was approximately 1.5 percentage points, so the estimates in months 8-16 represent an increase of 78 to 110 percent.

Next, I estimate the impact of killings on the racial gap in a set of birth outcomes. Estimated impacts on birth weight and the incidence of low birth weight are illustrated in Figure 3. Estimates in nearly all months following a killing are small and not statistically significant. The lone exception is month 9, in which the estimated impact on the raical gap in birth weight is -12.99 grams and the estimated impact on the racial gap in the incidence of low birth weight is 0.63 percentage points, and both estimates are statistically significant.

Estimated impacts on gestation length and the incidence of pre-term birth are illustrated in Figure 4. For the first ten months following a killing, estimates are not statistically significant and mostly small in magnitude. However, estimates in the final five months–months 12-16–are suggestive of a worsened racial gap in gestation. Estimated impacts on the racial gap in gestation length are statistically significant in months 11, 12 and 15 and range from -0.057 to -0.083 weeks in these months, meaning that gestation for births to black mothers decreased by a greater amount than gestation for births to white mothers in these months. Similarly, estimated impacts on the racial gap in the incidence of pre-term birth are statistically significant in months 11-13 and month 15 and range from 0.96 to 1.32 percentage points in these months.

Given pre-killing means of about 0.5 weeks and 4.5 percentage points in the racial gaps in gestation length and pre-term birth, respectively, the estimated impacts in those months with statistically significant estimates represent impacts of 11.4 to 16.6 percent on the racial gap in gestation length and impacts of 21.3 to 29.3 percent on the racial gap in pre-term birth probability.

I also perform an event study analysis on additional birth outcomes, including five-minute APGAR score, sex of the child, and probability of a very low birth weight birth. These analyses are illustrated in Figure 5. For each of these variables, there are no statistically significant estimated impacts of a killing in any of the months following a killing.

One possible mechanism to explain any impact on racial gaps in maternal stress and birth outcomes is that a highly publicized killing induces a change in the composition of mothers giving birth by differentially discouraging mothers with certain characteristics from giving birth. If black mothers with low baseline levels of stress are discouraged to a greater degree than white mothers with low baseline levels of stress, it could explain the pattern described above.

To test for this mechanism, I once again run an event study analysis, this time using maternal characteristics as outcome variables. Results are illustrated in Figure 6. Estimated impacts on the racial gap in maternal age are positive and statistically significant in months 3-4 and months 7-15, ranging from 0.14 to 0.36 years; the estimates approximately level out after month 10, with all estimates thereafter falling between 0.29 and 0.36.

Similarly, estimated impacts on the racial gap in the fraction of mothers with less than a high school education are negative and statistically significant in months 8-15, with the exception of month 14, ranging from -0.6 to -1.3 percentage points.

Estimated effects on the fraction of mothers with a high school education and no college and on the fraction of mothers who are married are generally not statistically significant.

Given the apparent compositional changes in mothers giving birth following a killing, a natural follow-up question is whether the effects on maternal stress and birth outcomes can be fully explained by these compositional changes. After all, one could reasonably expect a relative increase in maternal stress to accompany a relative increase in maternal age.

With this question in mind, I run analyses on maternal stress and gestation outcomes with two new specifications. First, I add controls for age, education, and marital status to the regressions. Results are shown in Figure 7. While there are slight differences in the exact values of point estimates after adding controls, estimated impacts on racial gaps in gestational hypertension and pre-term birth are similar in magnitude and are statistically significant in the same months as without controls. Estimated impacts on the racial gap in gestation length, however, are not statistically significant aside from a single month 11 months after a killing.

Next, I run a re-weighted regression, re-weighting the post-killing observations so that the re-weighted observable characteristics of mothers who gave birth after a killing match the observable characteristics of mothers who gave birth prior to a killing.[2] Results are shown in Figure 8. Similar to the estimates from the previous specification with controls, these estimates approximately match the results from the primary sample. Point estimates are similar in magnitude across outcomes, and estimates are statistically significant in all months in which estimates in the primary sample were statistically significant. In addition, the estimated impact on the racial gap in pre-term birth in month 10 and the estimated impact on the racial gap in gestation in month 9 are statistically significant in this specification.

6.2 Alternative Samples

To further investigate the above findings, I run a set of additional analyses with different estimation samples. In these analyses, I focus on estimates using gestational hypertension, gestation, and pre-term birth as outcome variables since these are the outcome variables

[2]Pre-killing observations are assigned a weight of 1 while a post-killing observation i is assigned a weight of $\frac{P^{pre}_{\mathbf{X}_i}}{P^{post}_{\mathbf{X}_i}}$,where $\mathbf{X}_i$ is the vector of observable characteristics associated with observation i, $P^{pre}_{\mathbf{X}_i}$ is the fraction of the pre-killing sample with observable characteristics $\mathbf{X}_i$, and $P^{post}_{\mathbf{X}_i}$ is the fraction of the post-killing sample with observable characteristics $\mathbf{X}_i$.

with statistically significant estimates in the primary sample.

First, since the estimated impacts on gestational hypertension in the primary estimation sample remain large and statistically significant through the final month in the event study and the estimated impacts on pre-term birth probability only become statistically significant near the end of the event study, I remove the births associated with the two most recent killings from the estimation sample. This allows for an extension of the event study from 15 months post-killing to 25 months post-killing.

Results are shown in Figure 9. Estimates through the first 15 months remain largely consistent with the primary results. Following month 15, the estimated impact on the racial gap in gestational hypertension remains consistently large and statistically significant through month 25, suggesting that this is a long-term persistent effect. On the other hand, estimated impacts on the racial gaps in pre-term birth and gestation are generally not statistically significant beyond month 15, suggesting that this may be more of a data artifact occurring in a small subset of months rather than a true consistent effect of a killing and resultant maternal stress effects.

Next, I look deeper into the hypothesis that the observed effects are at least partially caused by media coverage and social media proliferation. I do so using two separate methods.

First, I restrict the estimation sample to births associated with the five most searched killings as defined by peak Google Trends data on Google searches including first and last names of the deceased; I call this sample the “high coverage sample.” Under the hypothesis that more widely disseminated killings cause greater stress impacts and that stress impacts are disproportionately borne by black mothers, estimates from the high coverage sample should be larger than estimates from the primary sample. Results shown in Figure 10 align with that hypothesis. While the confidence intervals typically overlap, the point estimates for gestational hypertension in the high coverage sample are consistently about 0.5 percentage points larger than the point estimates for the same months in the primary estimation sample. There is no such pattern observed in estimates for pre-term birth or gestation, as the results are largely similar across samples.

As a second test of the augmenting effect of media and social media coverage, I estimate impacts using a separate sample of killings. Beginning with the Washington Post database of fatal police shootings [3], I restrict to shootings in 2018 or earlier in which the casualty was black and unarmed. Additionally, I restrict the data to killings for which the peak Google trends data on Google searches including first and last names of the deceased is lower than the same data for any of the killings in the primary estimation sample. 90 shootings in the database meet these restrictions, and I build a sample of births around these shootings using the same process as described in section 4.1. I call this sample the "low coverage sample".

Results from the low coverage sample are shown in Figure 11. Estimated impacts on the racial gap in gestational hypertension among the low coverage sample remain statistically indistinguishable from zero for a longer period of time post-killing than the same estiamtes for the primary sample. Additionally, the low coverage sample estimates are consistently smaller than those from the main sample in the months where they are statistically significant. These comparisons lend additional support to the hypothesis that effects are augmented by coverage. However, this result must be interpreted with caution due to the existence of persistent pre-trends in the low coverage sample. Estimated impacts on the racial gap in pre-term birth and gestation in the low coverage sample similarly show both a dampened magnitude of point estimates relative to estimates in the primary sample as well as pre-trends in estimates. Due to increased precision resulting from a larger sample size in this estimation sample, estimated impacts on gestation are statistically significant in months 12-15.

6.3 Discussion

The preceding results suggest that, following a highly publicized police-involved killing of a black American, the racial gap in maternal stress is exacerbated. Black mothers, who already experienced gestational hypertension at a rate about 1.5 percentage points higher

[3] The Washington Post database of fatal police shootings is maintained here: https://github.com/washingtonpost/data-police-shootings

than the rate in the white population in the period prior to a killing, see this gap widen by about 0.7 to 1.7 additional percentage points, beginning about 6 months after a killing and persisting thereafter. Furthermore, additional specifications suggest that this effect lingers at least 25 months after the killing occurs, and the effect appears to be augmented by heavy circulation of news of the killing.

Contrary to many previous studies of the effects of stress on birth outcomes, there is no consistent effect on the racial gap in birth outcomes such as birth weight and gestation in the periods in which gestational hypertension is affected. There is a small set of months in which the estimated impact on the racial gap in gestation outcomes is statistically significant, but the effects are short-lived and erratic in comparison to the stable, persistent effects on maternal stress outcomes.

The lack of impacts on a newborn at the time of birth, however, is by no means a conclusive indication that the observed stress impacts are harmless or insignificant to the child's health or outlook. There is an established precedent for in-utero exposure to negative stimuli having no impact on birth outcomes while having significant impact on later-life outcomes. Kelly (2011) studies the impact of the Asian influenza pandemic of 1957, finding that the epidemic only affected the birth weight of certain sub-populations while cognitive outcomes measured at ages 7 and 11 were impacted across the distribution of observable characteristics. Schulz (2010) notes that people exposed in-utero to the 1944 Dutch Hunger Winter during early gestation had normal birth weights but higher rates of obesity than people born before and after the war. Most relevant to the current study, in a study of siblings, Aizer et al. (2016) find that in-utero exposure to increased levels of cortisol–a hormone released in response to stress–had no impact on birth weight or gestation but did have large negative impacts on adult educational attainment and childhood cognition and health.

With those results in mind, the impacts of police-involved killings on gestational hypertension are compelling on their own. Despite the lack of an immediate impact at the time of birth, there is reason to suspect that there may be longer-term impacts on vital economic outcomes like education, cognitive outcomes, and health, which could subsequently have further impacts on outcomes like employment and earnings in adulthood.

6.4 Validation

Validity of the empirical design relies on the assumption of parallel trends. To test this assumption, I test for the existence of pre-trends in the outcome variables. For the primary sample and specification, these tests are illustrated in in Figures 2-6; any estimates that are statistically significantly different from zero in the months prior to the shooting imply the existence of pre-trends and therefore call into question the validity of the model.

For most outcomes in most months, the estimates are statistically indistinguishable from 0. Some outcomes–notably pre-term birth and gestational hypertension–have a single pre-killing estimate that is statistically different from zero two months prior to a killing. While this is certainly a threat to validity and not a factor to be completely ignored, the fact that pre-trends only exist in a single month for these outcomes, while estimates in several months before and after that month return to zero, does mitigate the concerns to a degree.

Results from the low coverage and high coverage samples exhibit a more concerning pattern of pre-trends. With one exception–gestational hypertension in the high coverage sample–each outcome in each of these samples has multiple pre-killing estimates that are statistically significantly different from zero. Thus there is relatively strong evidence against the assumption of parallel trends in both the low coverage and high coverage samples, suggesting that outcomes for black mothers and outcomes for white mothers should not necessarily be expected to change at the same rate and in the same direction among these samples and that the results must therefore be intepreted cautiously.

7 Conclusion

Highly publicized police-involved killings of Black Americans and the ensuing civil unrest have become commonplace in American culture, particularly in the years since the killing of Michael Brown in 2014. While there may be some obvious direct impacts of these killings–e.g. psychological trauma, property damage from protests and riots, and reduced trust in police–the indirect impacts could be just as widespread and impactful.

Using an event study design, I find that an already large racial gap in maternal stress is exacerbated following one of these killings. The gap is increased between 78 and 110 percent beginning 6 months after a killing and persisting thereafter at least as long as two years after the killing. These stress effects appear to be partially driven by media coverage; a specification focusing on the most-searched killings resulted in much higher estimated impacts, while a specification focusing on killings which received scant coverage resulted in much lower estimated impacts.

Despite the stark impacts on maternal stress, there is only limited evidence of a corresponding impact on infant birth outcomes. Aside from estimated impacts on gestation and pre-term birth probability in only a select few months, estimated impacts on the racial gap in birth outcomes are not statistically significant. While the lack of an impact on birth outcomes is surprising given the documented association between maternal stress and birth outcomes, precedent exists for in-utero exposure to negative stimuli affecting long-term outcomes while not affecting birth outcomes. Thus, these results call for future work to study impacts of killings on childhood and adult outcomes.

Results from this study emphasize the importance of comprehensive and effective police training. Even if a police-involved killing can be justified in a legal sense, it is difficult to justify from a cost-benefit standpoint in any situation where a death could have otherwise been avoided. The direct cost of a lost life is, of course, large and difficult to clearly calculate or comprehend, and indirect costs could be numerous and widespread, as illustrated by example by the toll taken on maternal stress shown in this paper, a toll which falls largely on the already vulnerable population of Black mothers.

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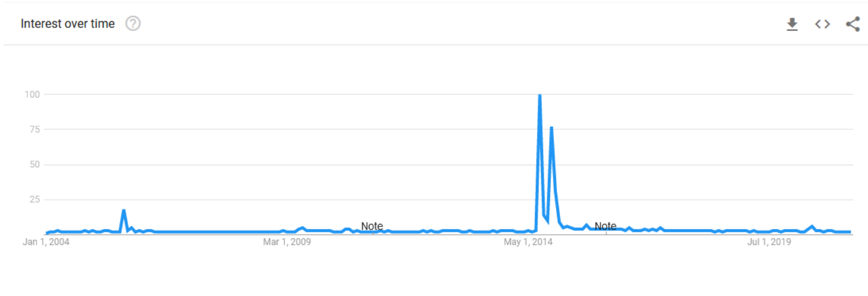
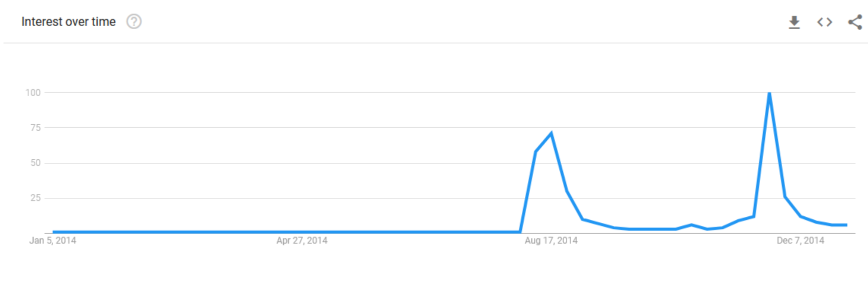
Figures and Tables

Figure 1: Google Trends Data surrounding Michael Brown killing

A. Full timeline: January 2004 to April 2021



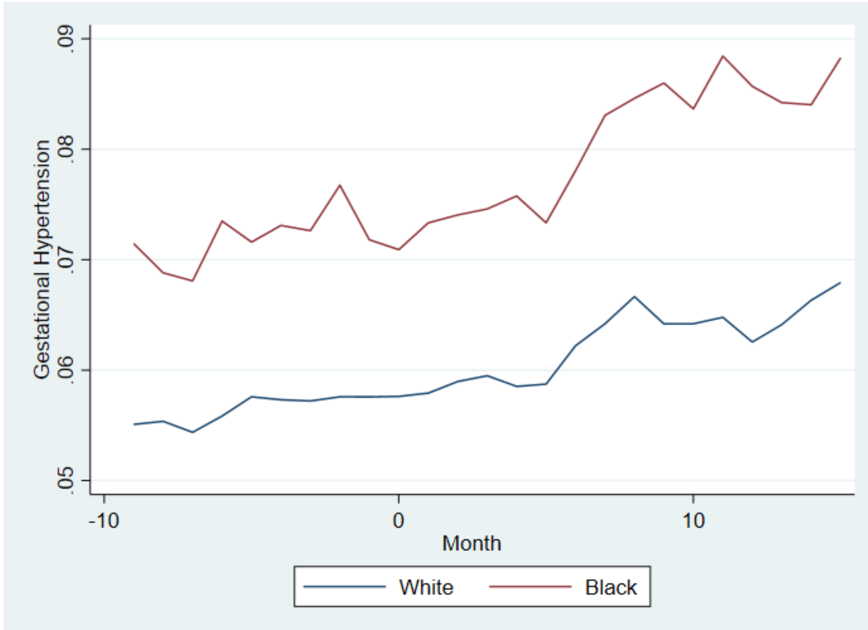
B. Year of 2014 Only



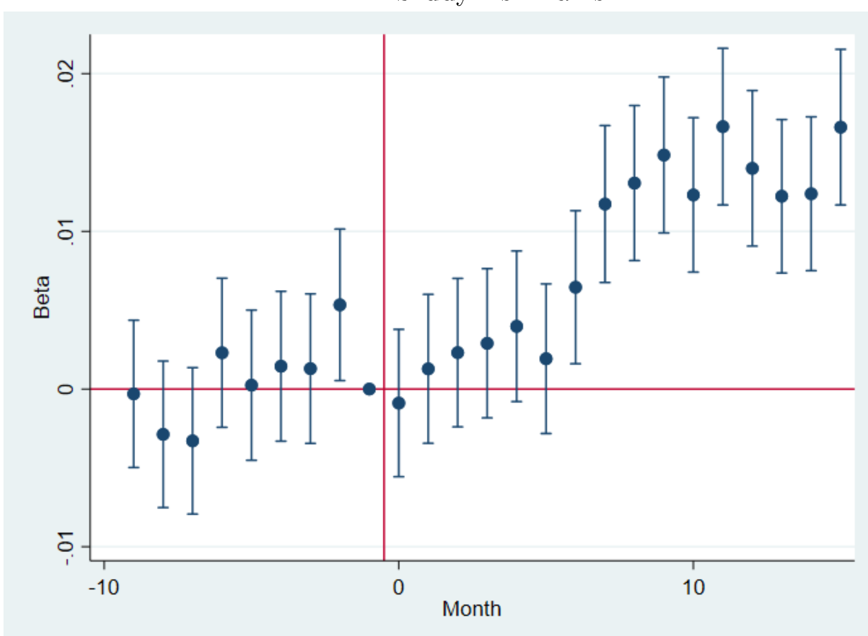
Notes: Figures show Google Trends search volume data on searches that included both “michael” and “brown”. Search volume is normalized so that peak search volume across the shown time period is 100, and other values that time period’s search volume as a percentage of peak search volume. \

Figure 2: Gestational Hypertension Means and Event Study Estimates

A. Probability of Gestational Hypertension by Race

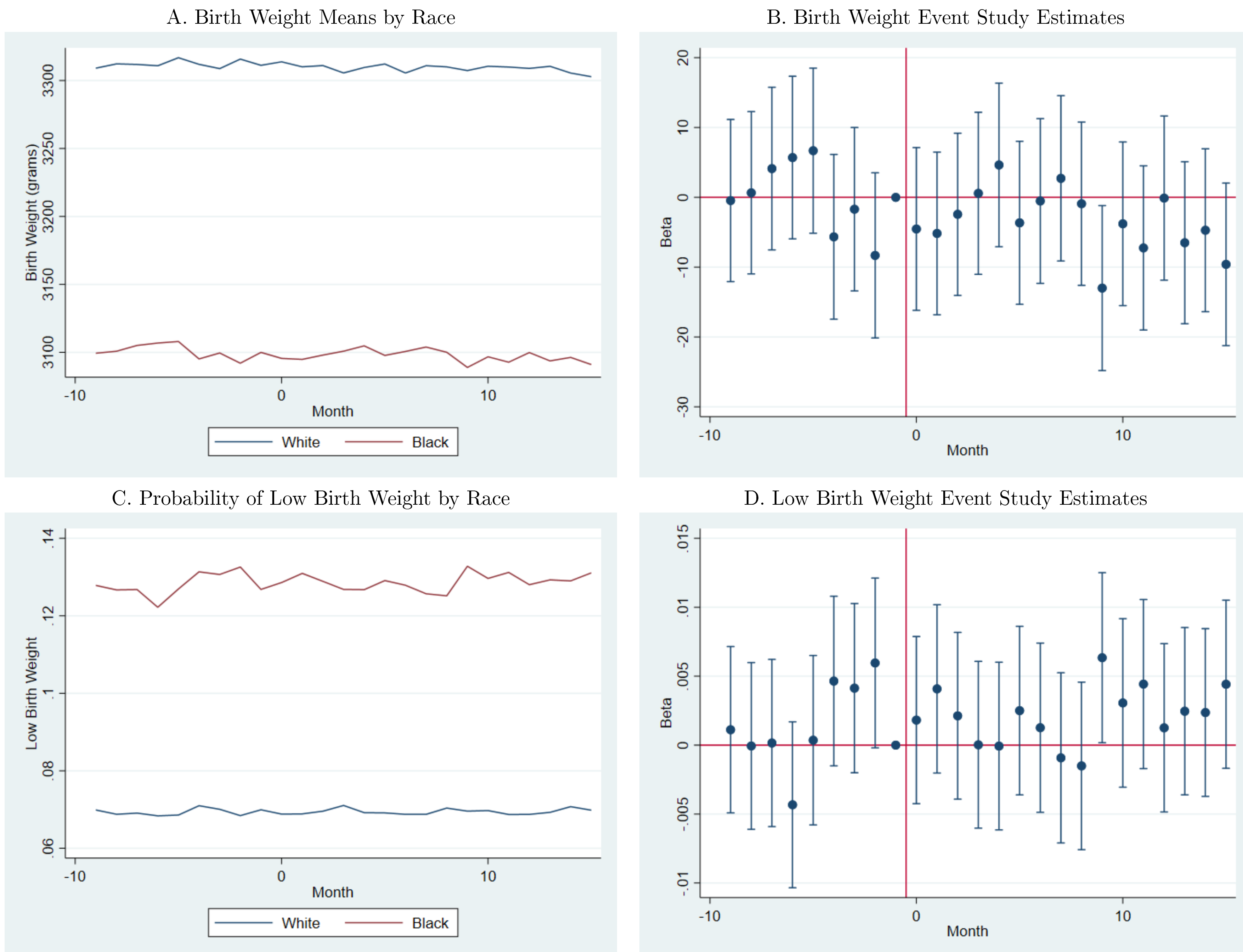


B. Event Study Estimates



Notes: Figures show means and event study estimates of an indicator variable for maternal gestational hypertension being reported on a birth certificate. Panel A shows means for white and black mothers. Panel B shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$.

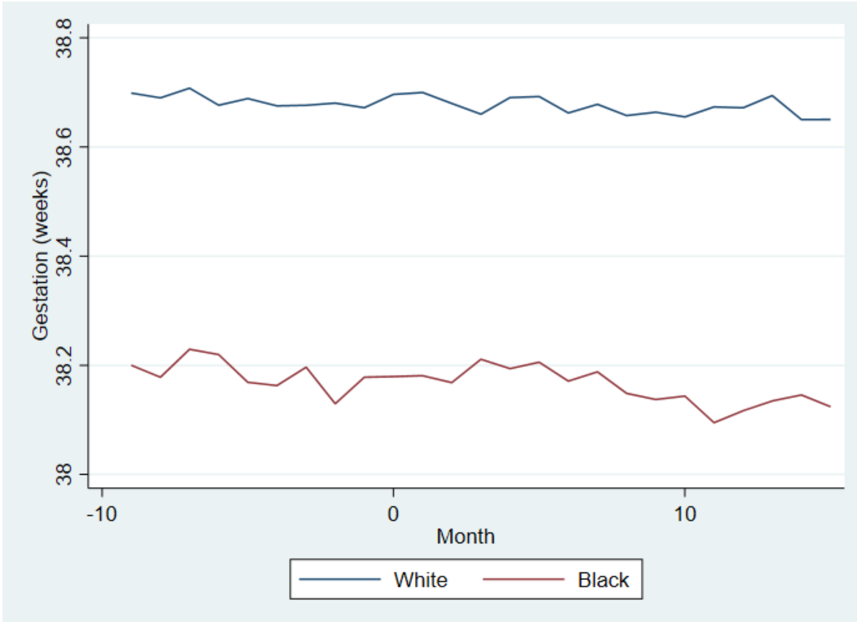
Figure 3: Birth Weight and Low Birth Weight Means and Event Study Estimates



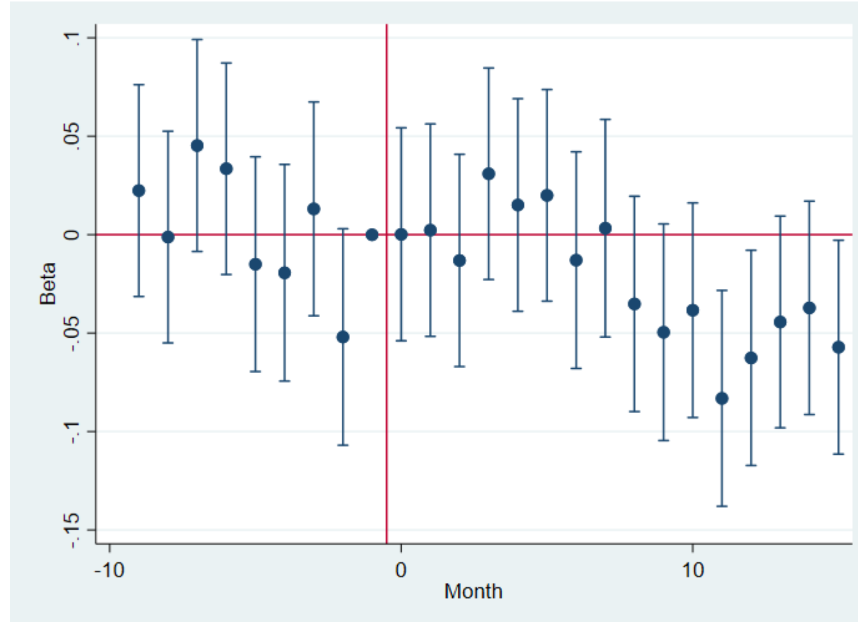
Notes: Figures show means and event study estimates of reported birth weight in grams and an indicator variable for birth weight being less than 2500 grams. Panels A and C show means for white and black mothers. Panels B and D show point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$.

Figure 4: Gestation and Preterm Birth Means and Event Study Estimates

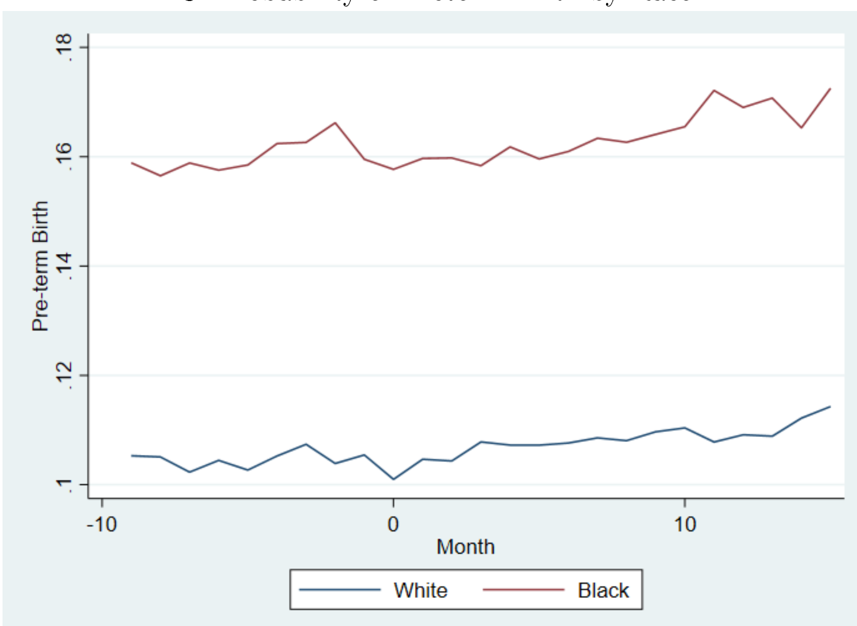
A. Gestation Means by Race



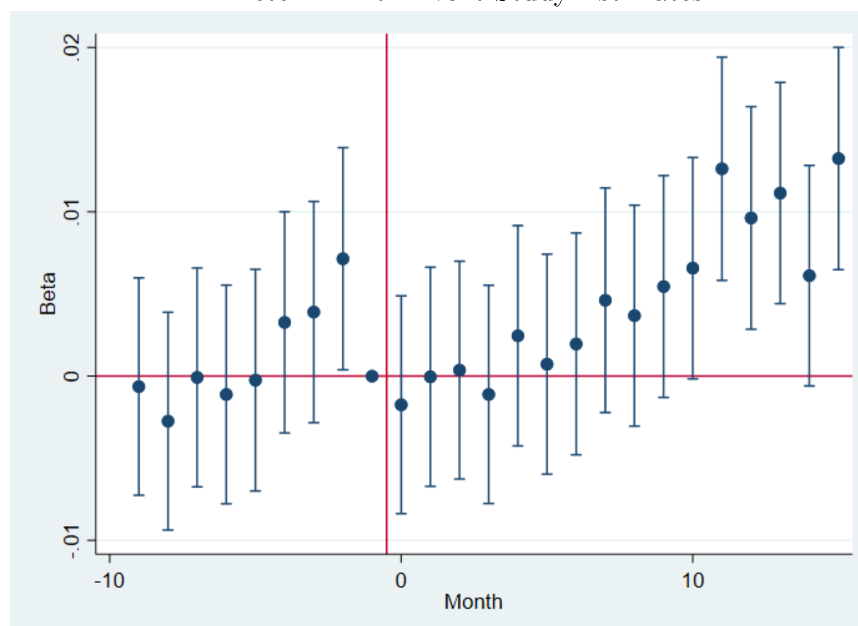
B. Gestation Event Study Estimates



C. Probability of Preterm Birth by Race

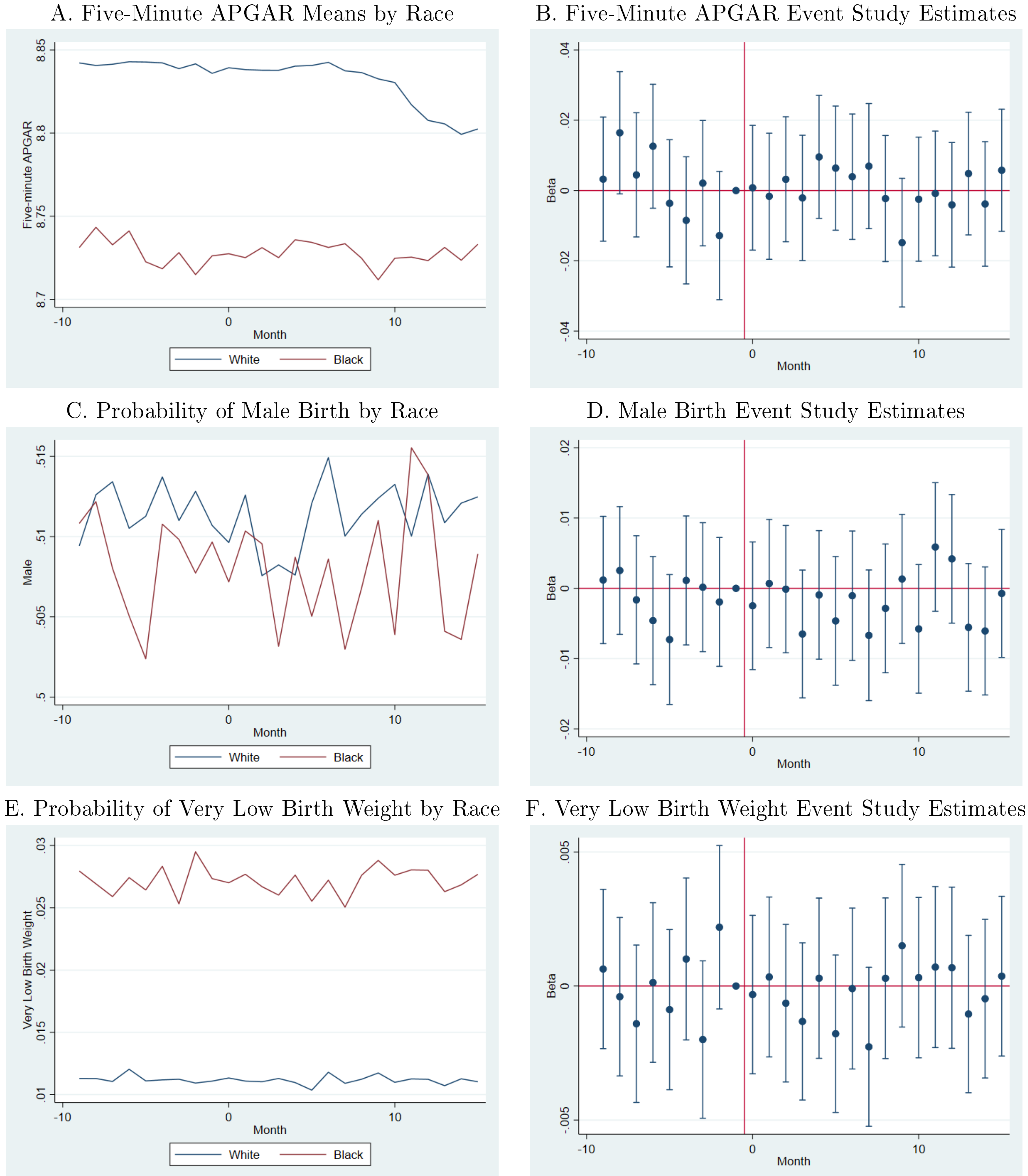


D. Preterm Birth Event Study Estimates



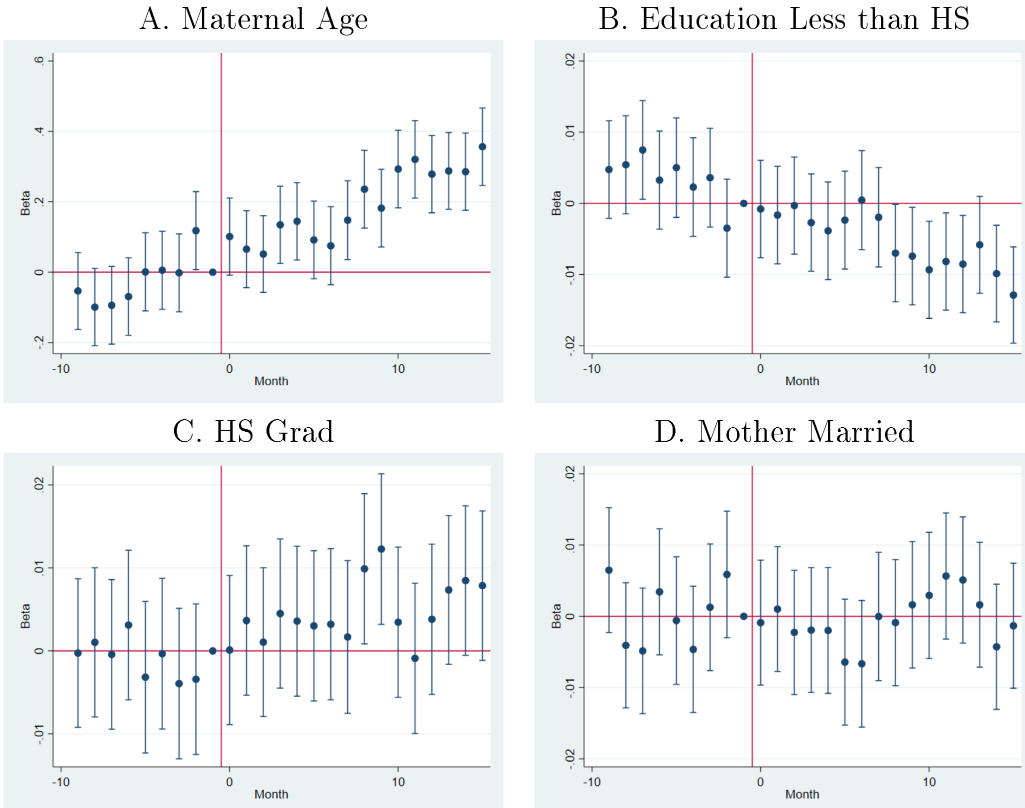
Notes: Figures show means and event study estimates of reported gestation length in weeks and an indicator variable for gestation length being less than 37 weeks. Panels A and C show means for white and black mothers. Panels B and D show point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$.

Figure 5: Other Birth Outcome Means and Event Study Estimates



Notes: Figures show means and event study estimates of five-minute APGAR scores, an indicator for child's sex being male, and an indicator for birth weight below 1500 grams. Panels A, C and E show means for white and black mothers. Panels B, D and F show point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$.

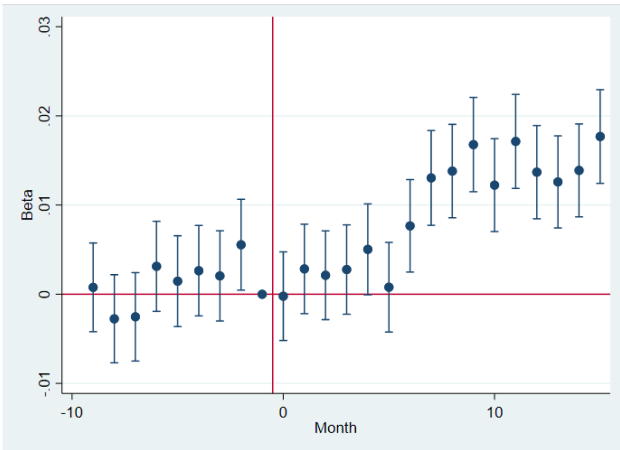
Figure 6: Maternal Characteristics Event Study Estimates



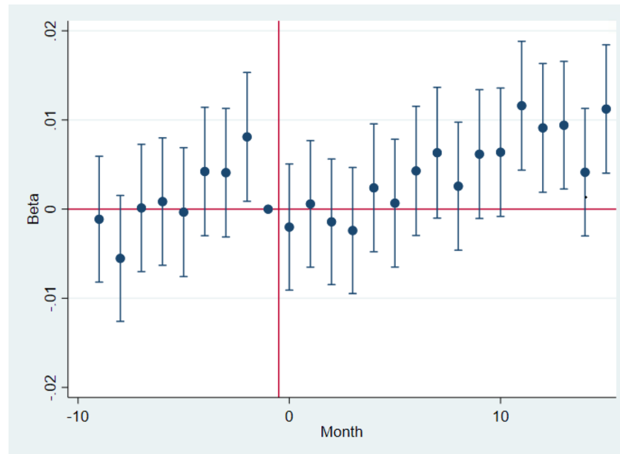
Notes: Figures show event study estimates of maternal characteristics: age, an indicator for less than high school education, an indcator for high school education without college, and an indicator for a mother being married. Each panel shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$ using a different maternal characteristic as an outcome variable.

Figure 7: Gestational Hypertension and Gestation Outcomes Event Study Estimates with Controls

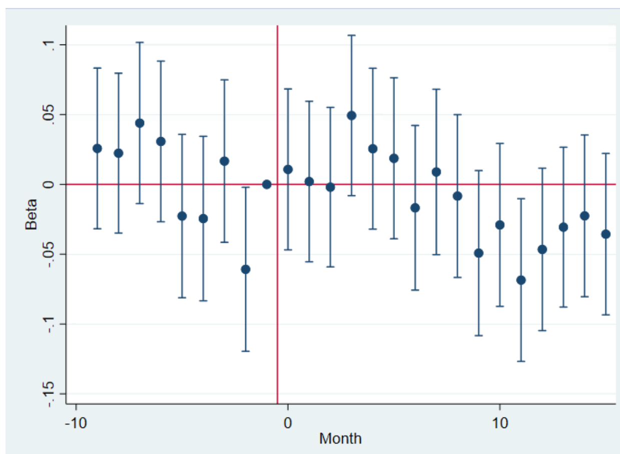
A. Gestational Hypertension



B. Pre-term Birth



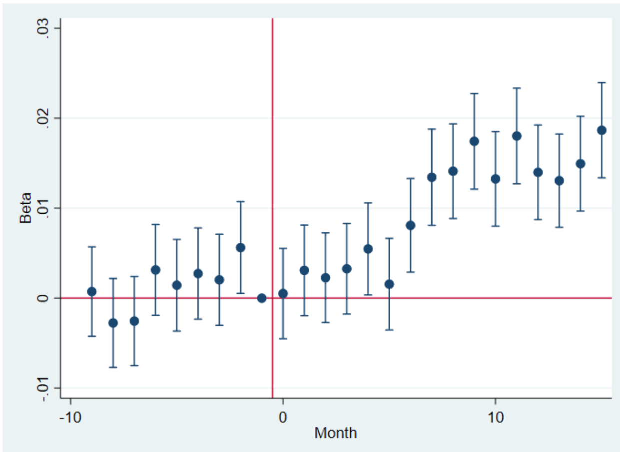
C. Gestation



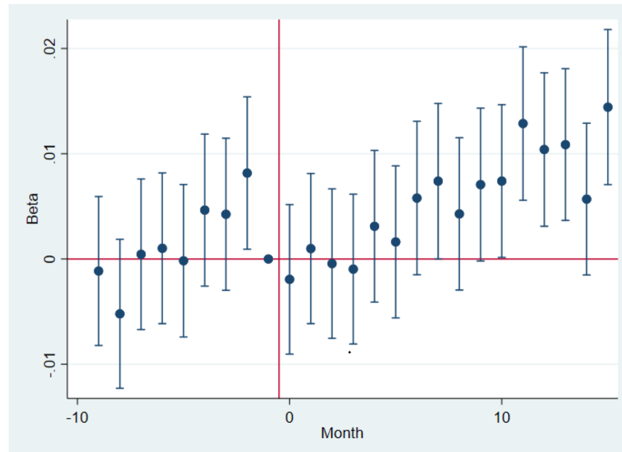
Notes: Figures show event study estimates of an indicator for gestational hypertension, and indicator for gestation length less than 37 weeks, and gestation length in weeks. Each panel shows point estimates and confidence intervals for values of β_2^m from a version of Equation 1 including additional controls for age, education, and marital status for $-9 \leq m \leq 15$.

Figure 8: Re-weighted Gestational Hypertension and Gestation Outcomes Event Study Estimates

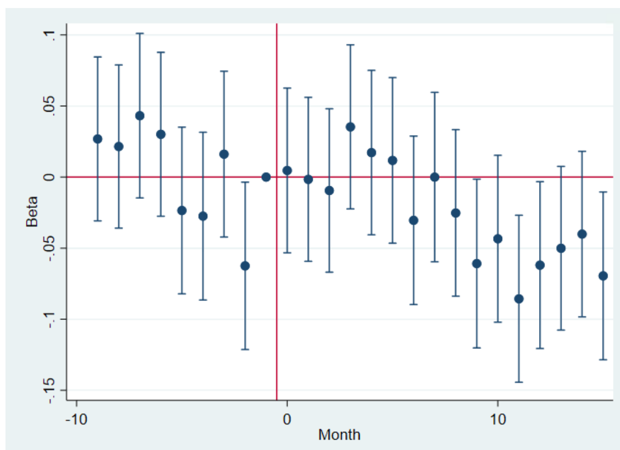
A. Gestational Hypertension



B. Pre-term Birth



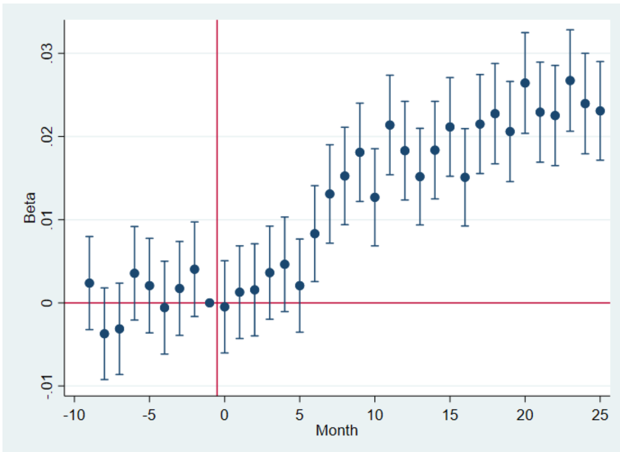
C. Gestation



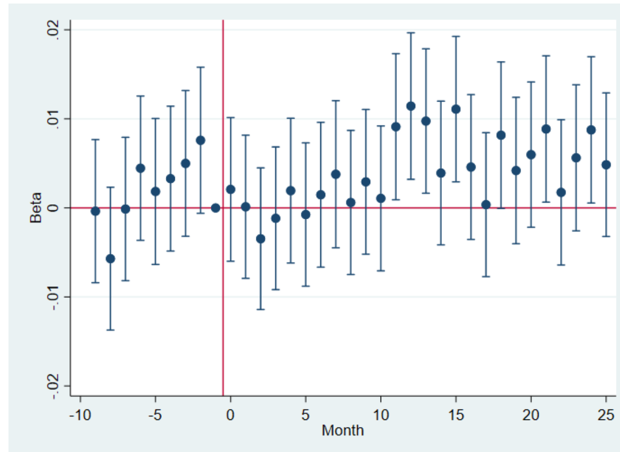
Notes: Figures show event study estimates of an indicator for gestational hypertension, and indicator for gestation length less than 37 weeks, and gestation length in weeks. Each panel shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. Observations in months 0 to 15 are re-weighted to match observable characteristics from observations in months -9 to -1.

Figure 9: Gestational Hypertension and Gestation Outcomes Event Study Estimates with Extended Time Horizon

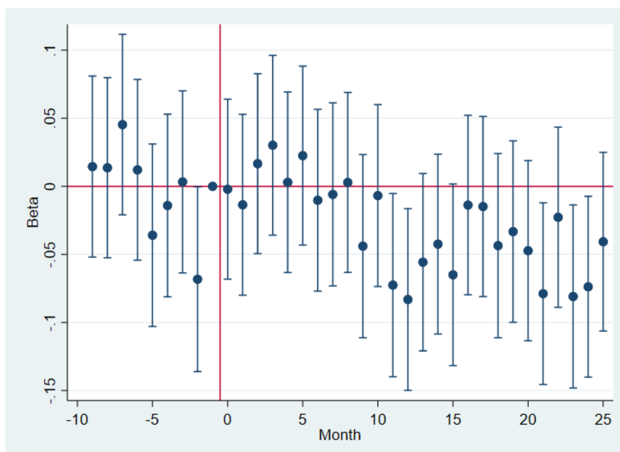
A. Gestational Hypertension



B. Pre-term Birth



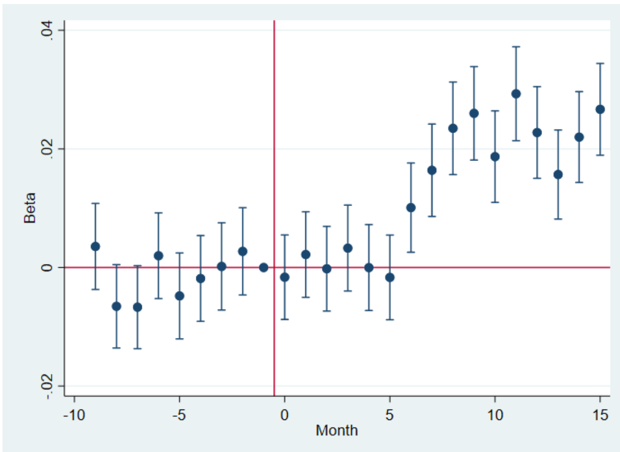
C. Gestation



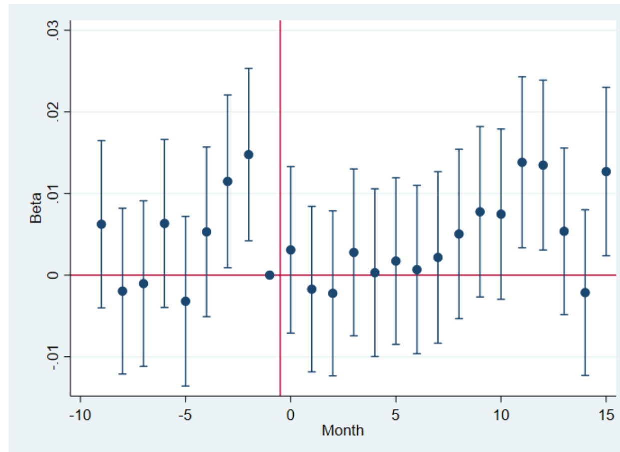
Notes: Figures show event study estimates of an indicator for gestational hypertension, and indicator for gestation length less than 37 weeks, and gestation length in weeks. Each panel shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 25$.

Figure 10: Gestational Hypertension and Gestation Outcomes Event Study Estimates (High Coverage Sample)

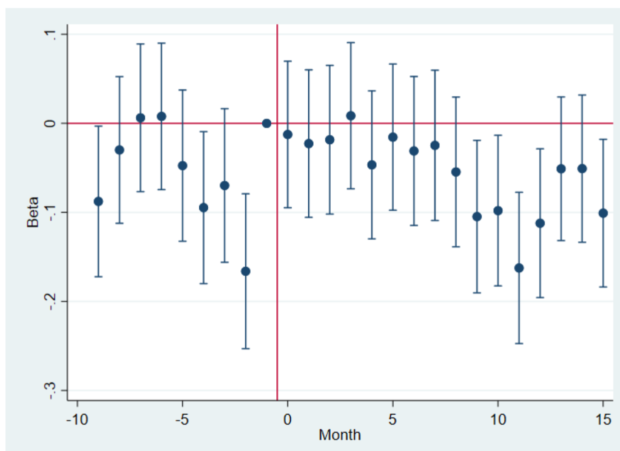
A. Gestational Hypertension



B. Pre-term Birth



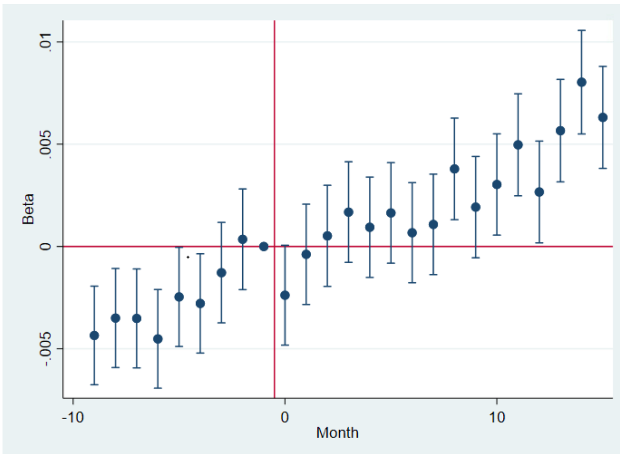
C. Gestation



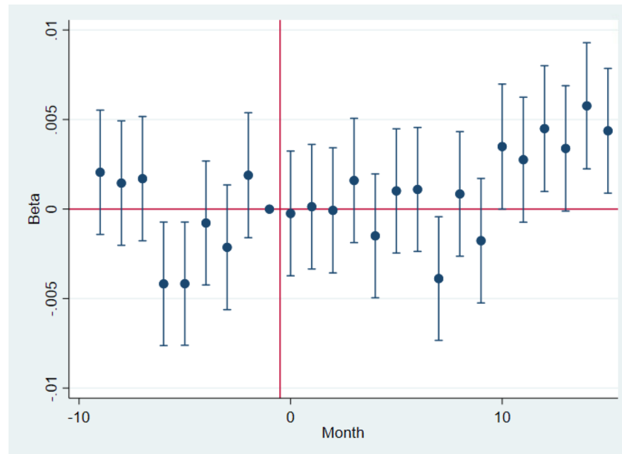
Notes: Figures show event study estimates of an indicator for gestational hypertension, and indicator for gestation length less than 37 weeks, and gestation length in weeks. Each panel shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. These estimates use a different sample from estimates in Figures 2 and 4, constructed using the five most-searched killings as defined by peak Google Trends data on Google searches including first and last names of the deceased.

Figure 11: Gestational Hypertension and Gestation Outcomes Event Study Estimates (Low Coverage Sample)

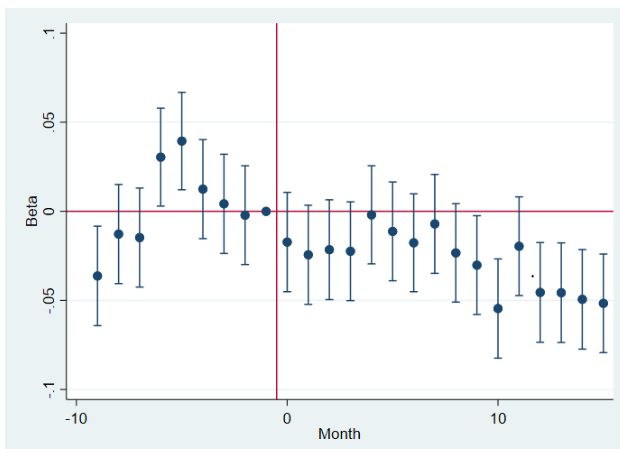
A. Gestational Hypertension



B. Pre-term Birth



C. Gestation



Notes: Figures show event study estimates of an indicator for gestational hypertension, and indicator for gestation length less than 37 weeks, and gestation length in weeks. Each panel shows point estimates and confidence intervals for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. These estimates use a different sample from estimates in Figures 2 and 4, constructed using killings from the Washington Post's database of fatal police shootings, restricted to unarmed black victims whose first and last names have sufficiently low peak search volume according to Google Trends.

Table 1: Estimated Impact of Police-Involved Killings on Maternal Gestational Hypertension

	(1)	(2)	(3)	(4)	(5)
Month -9	-0.000302	0.000776	0.000730	0.00354	-0.00435***
	(0.00238)	(0.00253)	(0.00254)	(0.00370)	(0.00123)
Month -8	-0.00287	-0.00275	-0.00275	-0.00654	-0.00350**
	(0.00237)	(0.00252)	(0.00252)	(0.00358)	(0.00124)
Month -7	-0.00328	-0.00253	-0.00255	-0.00668	-0.00352**
	(0.00237)	(0.00253)	(0.00253)	(0.00357)	(0.00123)
Month -6	0.00230	0.00313	0.00314	0.00199	-0.00452***
	(0.00241)	(0.00258)	(0.00258)	(0.00369)	(0.00123)
Month -5	0.000246	0.00147	0.00144	-0.00479	-0.00247*
	(0.00243)	(0.00260)	(0.00260)	(0.00370)	(0.00124)
Month -4	0.00145	0.00264	0.00273	-0.00185	-0.00278*
	(0.00242)	(0.00258)	(0.00259)	(0.00369)	(0.00124)
Month -3	0.00130	0.00206	0.00204	0.000180	-0.00128
	(0.00242)	(0.00258)	(0.00258)	(0.00375)	(0.00125)
Month -2	0.00534*	0.00556*	0.00562*	0.00272	0.000351
	(0.00245)	(0.00260)	(0.00260)	(0.00376)	(0.00126)
Month 0	-0.000887	-0.000216	0.000516	-0.00164	-0.00238
	(0.00238)	(0.00253)	(0.00256)	(0.00363)	(0.00125)
Month 1	0.00128	0.00284	0.00309	0.00219	-0.000384
	(0.00241)	(0.00256)	(0.00257)	(0.00368)	(0.00125)
Month 2	0.00231	0.00213	0.00227	-0.000210	0.000519
	(0.00240)	(0.00254)	(0.00255)	(0.00364)	(0.00126)
Month 3	0.00290	0.00277	0.00327	0.00327	0.00168
	(0.00241)	(0.00256)	(0.00257)	(0.00370)	(0.00125)
Month 4	0.00398	0.00504	0.00547*	-1.28e-05	0.000940
	(0.00244)	(0.00260)	(0.00261)	(0.00370)	(0.00125)
Month 5	0.00193	0.000791	0.00155	-0.00167	0.00164
	(0.00242)	(0.00257)	(0.00260)	(0.00364)	(0.00125)
Month 6	0.00646**	0.00767**	0.00809**	0.0101**	0.000673
	(0.00248)	(0.00264)	(0.00265)	(0.00384)	(0.00125)
Month 7	0.0117***	0.0130***	0.0134***	0.0164***	0.00108
	(0.00254)	(0.00271)	(0.00273)	(0.00397)	(0.00125)
Month 8	0.0131***	0.0138***	0.0141***	0.0235***	0.00379**
	(0.00251)	(0.00267)	(0.00268)	(0.00398)	(0.00127)
Month 9	0.0148***	0.0168***	0.0174***	0.0260***	0.00192
	(0.00252)	(0.00270)	(0.00271)	(0.00402)	(0.00126)
Month 10	0.0123***	0.0122***	0.0133***	0.0187***	0.00303*
	(0.00250)	(0.00265)	(0.00268)	(0.00394)	(0.00126)
Month 11	0.0166***	0.0171***	0.0180***	0.0293***	0.00497***
	(0.00253)	(0.00269)	(0.00271)	(0.00404)	(0.00127)
Month 12	0.0140***	0.0137***	0.0140***	0.0228***	0.00266*
	(0.00252)	(0.00267)	(0.00268)	(0.00394)	(0.00127)
Month 13	0.0122***	0.0126***	0.0131***	0.0157***	0.00566***
	(0.00248)	(0.00263)	(0.00264)	(0.00383)	(0.00128)
Month 14	0.0124***	0.0139***	0.0149***	0.0220***	0.00803***
	(0.00249)	(0.00266)	(0.00269)	(0.00391)	(0.00129)
Month 15	0.0166***	0.0177***	0.0187***	0.0267***	0.00631***
	(0.00252)	(0.00268)	(0.00270)	(0.00395)	(0.00127)
N	3,297,225	2,503,328	2,503,439	981,544	13,385,543

Notes: This table shows point estimates and standard errors for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. The outcome is an indicator variable for gestational hypertension. Column (1) is the primary estimation sample and specification. Column (2) adds controls for age, education, and marital status. Column (3) shows estimates from a re-weighted sample to match post-killing characteristics to pre-killing characteristics. Column (4) shows estimates from the high-coverage sample. Column (5) shows estimates from the low-coverage sample.

Table 2: Estimated Impact of Police-Involved Killings on Gestation Length

	(1)	(2)	(3)	(4)	(5)
Month -9	0.0224	0.0258	0.0268	-0.0876*	-0.0362*
	(0.0274)	(0.0293)	(0.0294)	(0.0431)	(0.0142)
Month -8	-0.00118	0.0224	0.0215	-0.0298	-0.0127
	(0.0274)	(0.0292)	(0.0293)	(0.0420)	(0.0142)
Month -7	0.0453	0.0439	0.0432	0.00627	-0.0147
	(0.0275)	(0.0294)	(0.0295)	(0.0423)	(0.0142)
Month -6	0.0335	0.0308	0.0301	0.00785	0.0304*
	(0.0274)	(0.0293)	(0.0294)	(0.0420)	(0.0140)
Month -5	-0.0150	-0.0227	-0.0235	-0.0474	0.0395**
	(0.0278)	(0.0298)	(0.0299)	(0.0433)	(0.0139)
Month -4	-0.0193	-0.0245	-0.0275	-0.0946*	0.0125
	(0.0281)	(0.0300)	(0.0301)	(0.0435)	(0.0142)
Month -3	0.0131	0.0167	0.0161	-0.0697	0.00423
	(0.0277)	(0.0297)	(0.0298)	(0.0440)	(0.0142)
Month -2	-0.0520	-0.0608*	-0.0624*	-0.166***	-0.00214
	(0.0280)	(0.0300)	(0.0300)	(0.0444)	(0.0141)
Month 0	0.000206	0.0107	0.00466	-0.0125	-0.0172
	(0.0276)	(0.0294)	(0.0296)	(0.0420)	(0.0142)
Month 1	0.00232	0.00205	-0.00159	-0.0227	-0.0244
	(0.0275)	(0.0293)	(0.0294)	(0.0423)	(0.0142)
Month 2	-0.0131	-0.00197	-0.00943	-0.0184	-0.0215
	(0.0275)	(0.0291)	(0.0293)	(0.0426)	(0.0143)
Month 3	0.0310	0.0493	0.0353	0.00859	-0.0224
	(0.0274)	(0.0293)	(0.0294)	(0.0419)	(0.0141)
Month 4	0.0151	0.0255	0.0172	-0.0466	-0.00196
	(0.0275)	(0.0294)	(0.0295)	(0.0424)	(0.0140)
Month 5	0.0200	0.0187	0.0117	-0.0155	-0.0112
	(0.0274)	(0.0294)	(0.0297)	(0.0419)	(0.0142)
Month 6	-0.0129	-0.0168	-0.0304	-0.0310	-0.0176
	(0.0281)	(0.0301)	(0.0302)	(0.0427)	(0.0140)
Month 7	0.00331	0.00892	-1.08e-05	-0.0247	-0.00702
	(0.0282)	(0.0302)	(0.0304)	(0.0430)	(0.0142)
Month 8	-0.0351	-0.00834	-0.0252	-0.0545	-0.0233
	(0.0279)	(0.0297)	(0.0299)	(0.0429)	(0.0141)
Month 9	-0.0495	-0.0492	-0.0608*	-0.105*	-0.0302*
	(0.0281)	(0.0301)	(0.0303)	(0.0437)	(0.0141)
Month 10	-0.0383	-0.0290	-0.0434	-0.0980*	-0.0545***
	(0.0278)	(0.0298)	(0.0300)	(0.0431)	(0.0142)
Month 11	-0.0831**	-0.0685*	-0.0856**	-0.162***	-0.0196
	(0.0280)	(0.0297)	(0.0300)	(0.0433)	(0.0141)
Month 12	-0.0626*	-0.0465	-0.0619*	-0.112**	-0.0455**
	(0.0279)	(0.0297)	(0.0299)	(0.0426)	(0.0143)
Month 13	-0.0443	-0.0306	-0.0501	-0.0510	-0.0456**
	(0.0274)	(0.0292)	(0.0294)	(0.0411)	(0.0143)
Month 14	-0.0371	-0.0225	-0.0401	-0.0508	-0.0494***
	(0.0276)	(0.0295)	(0.0297)	(0.0422)	(0.0142)
Month 15	-0.0571*	-0.0356	-0.0695*	-0.101*	-0.0516***
	(0.0277)	(0.0295)	(0.0301)	(0.0423)	(0.0141)
N	3,298,373	2,504,932	2,504,932	982,040	13,382,969

Notes: This table shows point estimates and standard errors for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. The outcome is reported gestation in weeks. Column (1) is the primary estimation sample and specification. Column (2) adds controls for age, education, and marital status. Column (3) shows estimates from a re-weighted sample to match post-killing characteristics to pre-killing characteristics. Column (4) shows estimates from the high-coverage sample. Column (5) shows estimates from the low-coverage sample.

Table 3: Estimated Impact of Police-Involved Killings on Pre-term Birth

	(1)	(2)	(3)	(4)	(5)
Month -9	-0.000637	-0.00113	-0.00117	0.00623	0.00206
	(0.00338)	(0.00360)	(0.00361)	(0.00523)	(0.00177)
Month -8	-0.00274	-0.00553	-0.00526	-0.00196	0.00145
	(0.00338)	(0.00360)	(0.00361)	(0.00518)	(0.00177)
Month -7	-7.79e-05	0.000133	0.000398	-0.00104	0.00170
	(0.00340)	(0.00364)	(0.00365)	(0.00518)	(0.00177)
Month -6	-0.00112	0.000846	0.000991	0.00633	-0.00417*
	(0.00339)	(0.00365)	(0.00365)	(0.00525)	(0.00176)
Month -5	-0.000246	-0.000336	-0.000217	-0.00320	-0.00417*
	(0.00344)	(0.00369)	(0.00370)	(0.00531)	(0.00176)
Month -4	0.00327	0.00422	0.00460	0.00530	-0.000775
	(0.00344)	(0.00368)	(0.00368)	(0.00530)	(0.00177)
Month -3	0.00390	0.00409	0.00428	0.0115*	-0.00213
	(0.00344)	(0.00368)	(0.00369)	(0.00540)	(0.00178)
Month -2	0.00714*	0.00811*	0.00813*	0.0148**	0.00189
	(0.00345)	(0.00369)	(0.00369)	(0.00539)	(0.00178)
Month 0	-0.00175	-0.00201	-0.00177	0.00309	-0.000242
	(0.00338)	(0.00361)	(0.00363)	(0.00520)	(0.00178)
Month 1	-4.02e-05	0.000587	0.000989	-0.00172	0.000135
	(0.00340)	(0.00362)	(0.00364)	(0.00517)	(0.00177)
Month 2	0.000365	-0.00142	-0.000428	-0.00223	-6.95e-05
	(0.00338)	(0.00359)	(0.00362)	(0.00516)	(0.00178)
Month 3	-0.00112	-0.00240	-0.000944	0.00278	0.00160
	(0.00339)	(0.00361)	(0.00363)	(0.00521)	(0.00177)
Month 4	0.00245	0.00239	0.00306	0.000296	-0.00149
	(0.00342)	(0.00366)	(0.00368)	(0.00524)	(0.00176)
Month 5	0.000729	0.000674	0.00159	0.00172	0.00102
	(0.00342)	(0.00366)	(0.00368)	(0.00521)	(0.00177)
Month 6	0.00196	0.00429	0.00576	0.000677	0.00110
	(0.00344)	(0.00370)	(0.00372)	(0.00526)	(0.00177)
Month 7	0.00462	0.00633	0.00736	0.00216	-0.00388*
	(0.00349)	(0.00374)	(0.00377)	(0.00536)	(0.00176)
Month 8	0.00368	0.00257	0.00425	0.00504	0.000848
	(0.00343)	(0.00366)	(0.00369)	(0.00530)	(0.00177)
Month 9	0.00545	0.00617	0.00703	0.00776	-0.00176
	(0.00344)	(0.00368)	(0.00370)	(0.00533)	(0.00177)
Month 10	0.00657	0.00638	0.00737*	0.00747	0.00349*
	(0.00344)	(0.00367)	(0.00370)	(0.00532)	(0.00178)
Month 11	0.0126***	0.0116**	0.0128***	0.0138**	0.00276
	(0.00347)	(0.00369)	(0.00372)	(0.00534)	(0.00178)
Month 12	0.00963**	0.00912*	0.0104**	0.0135*	0.00450*
	(0.00346)	(0.00368)	(0.00372)	(0.00531)	(0.00179)
Month 13	0.0111**	0.00941**	0.0108**	0.00537	0.00339
	(0.00343)	(0.00365)	(0.00368)	(0.00521)	(0.00179)
Month 14	0.00611	0.00414	0.00565	-0.00214	0.00577**
	(0.00342)	(0.00365)	(0.00368)	(0.00518)	(0.00180)
Month 15	0.0132***	0.0112**	0.0144***	0.0127*	0.00437*
	(0.00345)	(0.00367)	(0.00376)	(0.00527)	(0.00178)
N	3,300,365	2,505,943	2,506,054	983,055	13,392,108

Notes: This table shows point estimates and standard errors for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. The outcome is an indicator variable for gestation length less than 37 weeks. Column (1) is the primary estimation sample and specification. Column (2) adds controls for age, education, and marital status. Column (3) shows estimates from a re-weighted sample to match post-killing characteristics to pre-killing characteristics. Column (4) shows estimates from the high-coverage sample. Column (5) shows estimates from the low-coverage sample.

Table 4: Estimated Impact of Police-Involved Killings on Other Birth Outcomes

	(1) Birth Weight	(2) Low BW	(3) Very Low BW	(4) APGAR	(5) Male
Month -9	-0.454	0.00112	0.000634	0.00324	0.00119
	(5.922)	(0.00308)	(0.00151)	(0.00901)	(0.00462)
Month -8	0.658	-5.86e-05	-0.000399	0.0164	0.00254
	(5.928)	(0.00308)	(0.00151)	(0.00888)	(0.00464)
Month -7	4.124	0.000154	-0.00141	0.00446	-0.00163
	(5.942)	(0.00309)	(0.00150)	(0.00902)	(0.00465)
Month -6	5.700	-0.00433	0.000130	0.0126	-0.00459
	(5.938)	(0.00307)	(0.00152)	(0.00900)	(0.00465)
Month -5	6.688	0.000356	-0.000881	-0.00362	-0.00728
	(6.029)	(0.00313)	(0.00152)	(0.00923)	(0.00471)
Month -4	-5.648	0.00465	0.00101	-0.00848	0.00112
	(6.021)	(0.00314)	(0.00154)	(0.00923)	(0.00468)
Month -3	-1.695	0.00413	-0.00200	0.00210	0.000159
	(5.970)	(0.00313)	(0.00150)	(0.00910)	(0.00468)
Month -2	-8.312	0.00596	0.00219	-0.0128	-0.00194
	(6.034)	(0.00314)	(0.00155)	(0.00931)	(0.00468)
Month 0	-4.526	0.00182	-0.000319	0.000794	-0.00248
	(5.946)	(0.00309)	(0.00151)	(0.00905)	(0.00463)
Month 1	-5.163	0.00408	0.000337	-0.00163	0.000686
	(5.941)	(0.00311)	(0.00152)	(0.00915)	(0.00465)
Month 2	-2.426	0.00213	-0.000641	0.00321	-0.000115
	(5.924)	(0.00309)	(0.00150)	(0.00907)	(0.00462)
Month 3	0.580	2.53e-05	-0.00132	-0.00209	-0.00650
	(5.920)	(0.00309)	(0.00150)	(0.00910)	(0.00464)
Month 4	4.642	-6.90e-05	0.000291	0.00956	-0.000935
	(5.974)	(0.00310)	(0.00153)	(0.00893)	(0.00466)
Month 5	-3.642	0.00250	-0.00178	0.00639	-0.00463
	(5.954)	(0.00312)	(0.00150)	(0.00901)	(0.00467)
Month 6	-0.518	0.00126	-9.46e-05	0.00394	-0.00105
	(6.017)	(0.00313)	(0.00153)	(0.00911)	(0.00470)
Month 7	2.727	-0.000923	-0.00227	0.00694	-0.00669
	(6.040)	(0.00315)	(0.00151)	(0.00908)	(0.00474)
Month 8	-0.907	-0.00151	0.000289	-0.00227	-0.00285
	(5.964)	(0.00310)	(0.00153)	(0.00915)	(0.00467)
Month 9	-12.99*	0.00634*	0.00150	-0.0148	0.00133
	(6.027)	(0.00315)	(0.00155)	(0.00934)	(0.00468)
Month 10	-3.783	0.00306	0.000313	-0.00246	-0.00577
	(5.976)	(0.00312)	(0.00153)	(0.00901)	(0.00467)
Month 11	-7.238	0.00443	0.000707	-0.000828	0.00588
	(5.999)	(0.00313)	(0.00153)	(0.00905)	(0.00467)
Month 12	-0.102	0.00126	0.000682	-0.00406	0.00419
	(5.999)	(0.00311)	(0.00153)	(0.00904)	(0.00467)
Month 13	-6.494	0.00246	-0.00104	0.00484	-0.00555
	(5.916)	(0.00309)	(0.00150)	(0.00890)	(0.00463)
Month 14	-4.708	0.00236	-0.000473	-0.00382	-0.00606
	(5.951)	(0.00310)	(0.00151)	(0.00904)	(0.00465)
Month 15	-9.592	0.00441	0.000367	0.00577	-0.000724
	(5.937)	(0.00311)	(0.00152)	(0.00887)	(0.00465)
N	3,300,365	3,300,365	3,300,365	3,287,150	3,300,365

Notes: This table shows point estimates and standard errors for values of β_2^m from Equation 1 for $-9 \leq m \leq 15$. The outcomes vary by column. Column (1) is birth weight in grams. Column (2) is an indicator variable for birth weight less than 2500 grams. Column (3) is an indicator for birth weight less than 1500 grams. Column (4) is the five-minute APGAR score. Column (5) is an indicator variable for the child being born a male.

Table 5: Estimated Impact of Police-Involved Killings on Gestational Hypertension, Gestation, and Pre-term Birth (Extended Time Horizon)

	(1)	(2)	(3)
Month -9	0.00238	0.0145	-0.000364
	(0.00285)	(0.0339)	(0.00410)
Month -8	-0.00371	0.0136	-0.00570
	(0.00281)	(0.0337)	(0.00409)
Month -7	-0.00312	0.0453	-0.000123
	(0.00280)	(0.0338)	(0.00411)
Month -6	0.00355	0.0121	0.00446
	(0.00287)	(0.0339)	(0.00413)
Month -5	0.00207	-0.0359	0.00185
	(0.00290)	(0.0342)	(0.00418)
Month -4	-0.000571	-0.0141	0.00329
	(0.00285)	(0.0342)	(0.00415)
Month -3	0.00173	0.00327	0.00500
	(0.00288)	(0.0341)	(0.00418)
Month -2	0.00404	-0.0682*	0.00760
	(0.00290)	(0.0346)	(0.00419)
Month 0	-0.000481	-0.00212	0.00208
	(0.00283)	(0.0337)	(0.00412)
Month 1	0.00128	-0.0136	0.000129
	(0.00284)	(0.0339)	(0.00410)
Month 2	0.00157	0.0167	-0.00346
	(0.00282)	(0.0337)	(0.00406)
Month 3	0.00363	0.0302	-0.00117
	(0.00286)	(0.0337)	(0.00409)
Month 4	0.00463	0.00294	0.00194
	(0.00290)	(0.0338)	(0.00415)
Month 5	0.00207	0.0226	-0.000745
	(0.00286)	(0.0335)	(0.00411)
Month 6	0.00832**	-0.0102	0.00148
	(0.00294)	(0.0341)	(0.00415)
Month 7	0.0131***	-0.00593	0.00378
	(0.00302)	(0.0343)	(0.00421)
Month 8	0.0153***	0.00287	0.000613
	(0.00299)	(0.0337)	(0.00413)
Month 9	0.0181***	-0.0439	0.00293
	(0.00301)	(0.0343)	(0.00414)
Month 10	0.0127***	-0.00681	0.00107
	(0.00298)	(0.0341)	(0.00415)
Month 11	0.0214***	-0.0726*	0.00912*
	(0.00305)	(0.0343)	(0.00419)
Month 12	0.0183***	-0.0831*	0.0114**
	(0.00303)	(0.0340)	(0.00420)
Month 13	0.0152***	-0.0557	0.00976*
	(0.00296)	(0.0332)	(0.00414)
Month 14	0.0184***	-0.0424	0.00392
	(0.00299)	(0.0337)	(0.00412)
Month 15	0.0211***	-0.0650	0.0111**
	(0.00303)	(0.0340)	(0.00417)
Month 16	0.0151***	-0.0138	0.00459
	(0.00299)	(0.0336)	(0.00415)
Month 17	0.0215***	-0.0148	0.000365
	(0.00304)	(0.0338)	(0.00412)
Month 18	0.0227***	-0.0436	0.00817
	(0.00308)	(0.0345)	(0.00420)
Month 19	0.0206***	-0.0333	0.00420
	(0.00307)	(0.0340)	(0.00419)
Month 20	0.0264***	-0.0473	0.00598
	(0.00309)	(0.0338)	(0.00416)
Month 21	0.0229***	-0.0788*	0.00886*
	(0.00307)	(0.0340)	(0.00419)
Month 22	0.0225***	-0.0227	0.00175
	(0.00307)	(0.0338)	(0.00416)
Month 23	0.0267***	-0.0809*	0.00563
	(0.00311)	(0.0343)	(0.00419)
Month 24	0.0240***	-0.0738*	0.00876*
	(0.00308)	(0.0339)	(0.00419)
Month 25	0.0231***	-0.0407	0.00485
	(0.00302)	(0.0335)	(0.00411)
N	2,448,039	2,449,022	2,451,062

Notes: This table shows point estimates and standard errors for values of β_2^m from Equation 1 for $-9 \leq m \leq 25$. The outcomes vary by column. Column (1) is an indicator variable for gestational hypertension. Column (2) is reported gestation in weeks. Column (3) is an indicator for an indicator variable for gestation length less than 37 weeks.