PARENTAL INVOLVEMENT:
The Differential Impacts of Consent and Notice Requirements for Minors' Abortions

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Abstract

This paper uses pooled state level data for the years 1990-2015 to construct both double and triple difference models to estimate the impact of two abortion policies: parental consent and parental notice. The triple difference model utilizes a control group of teenagers aged 18-19 years-old who are not subject to these parental involvement laws. The results align with previous studies that analyzed the two laws as a singular explanatory variable, "involvement law", finding that following the introduction of a parental involvement law, minor abortion rates decline and birth rates increase. This paper provides new evidence that the primary drivers of the changes found in previous analysis are the consent laws. The results indicate that consent laws carry double the weight of notice laws – reducing the minor abortion rate by 14.7 – 16.6% and increasing the minor birth rate by 4.6 – 10.6%.

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I. Introduction

On January 22, 1973 The Supreme Court established the legal right to abortion in the United States with a (7-2) decision in *Roe v. Wade.* The Court ruled that the Constitutional right to 'liberty' included the decision of whether or not to terminate a pregnancy (Campbell, 1993). As a result, restrictions on abortion were required to meet the strict criteria of a "compelling state interest." In the nearly five decades since this landmark decision, state legislatures have passed over 1,200 restrictive abortion laws, with more than one-third occurring in the last nine years alone (Nash et al., 2019; Raphael & Hall, 2018). There are several different kinds of abortion restrictions enforced by states – physician requirements, waiting periods, and gestational limits to name a few.

The focus of this paper are two widely adopted policies that specifically place limitations on a minor's access to abortion by requiring the involvement of a parent. Consent statutes prohibit minors from obtaining an abortion without approval from a parent, and notice statutes require that a parent be notified, typically prior to the procedure. Supporters claim that these laws protect immature teenagers and reduce teen pregnancy. Opponents argue that most teenagers voluntarily involve their parent anyway and those that do not typically have good reason, such as fear of violence (Henshaw & Kost 1992). The impacts of these laws are potentially far reaching, particularly because approximately 82% of teen pregnancies are unintended and the number of abortions per pregnancy for teens is almost double the national average (Nash & Dreweke, 2019; Kost et. al, 2017).

Exploiting the variation in state implementation between 1990 and 2015, this paper estimates the impact of consent and notice laws on minor abortion and birth rates. During this time period, 29 states either introduced or updated an existing parental involvement law due in large part to the 1992 Supreme Court decision in *Planned Parenthood of Pennsylvania v Casey*. The court upheld several restrictive provisions enacted by Pennsylvania law makers, including a parental consent requirement.

Previous studies have analyzed the impact of parental involvement laws without distinguishing between consent and notice, potentially biasing the results. This paper seeks to fill this gap and

explore whether the two laws have differential impacts on minors' fertility outcomes. Using data from 47 states over this 26-year period, a difference-in-difference model estimates the change in minors' abortion and birth rates due to the enactment of these laws. A triple difference model is also constructed using teenagers aged 18-19 as a control group. The results of these regressions on the singular involvement variable mirror those of previous papers, which find that the laws lead to declines in abortion rates and increases in birth rates. However, this paper also finds that there is, in fact, a large difference in impact between the two levels of parental involvement, with the effect of notice laws being statistically insignificant.

As of May 1, 2020, 37 States have a parental involvement law – 26 require consent and 11 require notice. Understanding the full impact of these policies on the choices teenagers face, the decisions they make, and the consequences they experience is critical for policymakers and activists alike. This paper aims to contribute to the existing body of literature on the topic.

II. Literature Review

In the decades since *Roe,* there have been numerous empirical studies looking at the impacts of state abortion restrictions. Several focus wholly or in part on the impacts of parental involvement laws on teenagers' fertility outcomes. This section summarizes the key findings of the most relevant and often cited contributions to the literature. Existing research on this topic can loosely be divided into two groups: case studies and national-level pooled time series and cross sectional studies.

State Case Studies

The findings in state-level case studies are fairly consistent. One of the first and perhaps the most cited studies on this topic is the 1986 paper by Cartoof and Klerman that analyzed the impact of the 1981 Massachusetts parental consent law, using data from Massachusetts and five surrounding states on abortions obtained by Massachusetts minors and adults. They found that minors' abortions in the state fell by 50% following the introduction of the law. However, they attribute the bulk of this drop to out-of-state travel by minors seeking abortions and concluded that the law had little to no impact on pregnancy resolution behavior. Another state-level study

conducted by Henshaw (1995), looking at the 1993 Mississippi parental consent law, found results that mirrored the earlier Cartoof and Klerman (1986) study. Henshaw saw a decline in the ratio of in-state abortions by minors compared to adults which was offset by an increase in out-of-state abortions. As one would expect, he also found a drop in the ratio of out-of-state minors to adults obtaining abortions in Mississippi. Similarly, analysis of the adoption of involvement laws in Minnesota, Missouri, and Indiana (Ellertson, 1997), which expanded upon an earlier study (Rogers et al., 1995) of Minnesota's parental involvement law, found a reduction in abortion rates, little to no impact on birth rates, and evidence of interstate travel as the driver behind the change in minor abortion rates. Joyce and Kaestner (1996) analyze individual level data from South Carolina and Tennessee, using Virginia as a control group for their triple difference estimation. Interestingly, they find that the South Carolina law had a negative impact on non-black 16 year-olds abortion rates, but found no impact on any other group. Additionally, Joyce and Kaestner touch upon the potential differential impacts of consent and notice when explaining their results. They note that the consent requirement in South Carolina was more stringent than the notice law in Tennessee and posit that this could potentially account for the differences in impact.

National Studies

There are five main studies that have looked at the impact of parental involvement laws using state-level pooled time series and cross sectional data. Ohsfeldt and Gohmann (1994) analyzed data on minor and adult abortions by state of residence for the years 1984, 1985, and 1986, and found that on average minors' abortion rates fell by 18-22%. Haas-Wilson (1996) found results consistent with this earlier study using data by state of occurrence rather than residence for the years 1978-1990. Her model estimated a 13-25% reduction in minors' abortions as a result of involvement laws implemented during this time period. Two other studies utilize the variation of implementation among states, Kane and Staiger (1996) and Levine (2003). Both analyze the impact of involvement laws on teenagers' decisions at different stages of the 'decision tree'. These studies assume pregnancy is endogenous to the model, with fertility decisions following a similar format: first the decision to engage in sexual activity, then the decision to take preventative measures such as the use of contraception, and then finally once pregnant, the decision of whether to carry the pregnancy to term. These studies conceptualize abortion as an

insurance policy and involvement laws as increases in its price. The two papers align in their findings that parental involvement laws had little to no impact on birth rates. Levine found a 15-22% decline in abortion by state of residence, which he attributes to a reduction in pregnancies resulting from changed behavior at the first or second node of the decision tree. Both papers rely on the assumption that minors act as rational decision makers and alter their behavior based on changes to their state abortion policies. This is a strong assumption when considering the age demographic in question. The predicted rational change in behavior by teenagers at the early decision nodes would require them first to be aware of the abortion laws, second to believe that the law would have an impact on their ability to obtain an abortion, and third to make a decision to alter their sexual behavior based on this information. There is evidence to suggest that these conditions do not bear out in reality. A 1992 focus-group study of adolescents from cities across the U.S. found a general lack of accurate knowledge regarding abortion and specifically of their state's abortion laws (Stone & Waszak, 1992). In a survey of four Minnesota abortion clinics, fewer than 25% of teenagers reported that they were aware of the state's parental notification law (Blum et al., 1987). Furthermore, a pooled cross-sectional and time-series analysis examining sexually-transmitted infection (STI) rates for teenagers found no evidence that involvement laws alter minors' risky sexual behavior (Colman et al., 2013).

The most recent study (Meyers & Ladd, 2017) diverges from the previous literature in method and results. The authors divide their data into two time periods 1980-1992 and 1993-2014. The division is based on the *Planned Parenthood vs. Casey* decision in 1992. As shown in earlier case studies, minors in states with involvement laws seek-out abortions in neighboring states that do not have a law in place. As more states implement these laws, this becomes increasingly difficult. While their results for the earlier period are in line with previous studies that show no impact on birth rates, they find that in the post-Casey period involvement laws increased minor birth rates by an average of 2.8%. This difference is attributed to the proliferation of states with laws which adds more 'bite' to the involvement laws by restricting minors' ability to obtain out-of-state abortions.

III. Data

1. Abortions

Abortion data is reported in two ways: by state of occurrence, meaning the number of abortions that took place in a particular state, and by state of residence, meaning the number of abortions obtained by residents of a particular state regardless of where they were performed. Ideally, analysis on the impact of state policies would use the residence-based data. When occurrence data is used, the impact of a law on the minor abortion rate may be biased depending on policies in neighboring states. As seen in previous state-level studies, (Cartoof & Klerman, 1986; Henshaw, 1995; Ellertson, 1997) the in-state abortion rates dropped following the adoption of an involvement law, while the out-of-state abortion rate rose in direct response. This countervailing response is unaccounted for when occurrence data is used.

However, there is no direct measure of residence-based abortions, disaggregated by age. There are two main sources of abortion data: the Center for Disease Control's (CDC) Abortion Surveillances Reports and the Alan Guttmacher Institute (AGI). There are advantages and disadvantages to both, and each has been used in previous papers on this topic. The CDC annually compiles occurrence-based, age-specific abortion data from state central health agency reports, or in some cases from hospitals and other medical facilities. AGI conducts an "Abortion Provider Survey" every few years, collecting abortion data by state of occurrence. Generally, the AGI data is seen as a more comprehensive source of state abortion data because the data comes directly from providers. However, this data is not age-specific.

AGI augments its overall abortion rates by state of occurrence using CDC Abortion Surveillances data on the percentage of all abortions obtained by out-of-state residents. They then apply CDC data on the proportion of state abortions obtained by 15-17 and 18-19 year-olds to *estimate* teenage abortions by state of residence. However, as AGI notes, the estimates assume that all age groups exhibit the same travel behavior when obtaining abortions. Thus, the data is likely skewed for states with Parental Involvement laws if minors seek abortions out-of-state at higher rates than adults, as described in the literature. Additionally, AGI data is not reported every year and has inconsistent time intervals between each report (for the time period examined in this paper, data is available in 1992, 1996, 2000, 2005, 2010, 2011, and 2014).

Therefore, this paper uses the yearly CDC Abortion Surveillance Report data on the number of abortions by state of occurrence. Additional variables are included in the analysis to account for the potential confounding influence of interstate travel and are discussed at the end of this section. While the CDC compiles data for all 50 States and the District of Columbia as well as the City of New York, several states did not report the number of legal abortions by age for some or all of the years analyzed in this study. States that did not report this information for any of the years between 1990 and 2015 are: California, Florida, Illinois, and New Hampshire.

2. Births

Births by age and state of residence come from the Annie E. Casey Foundation's Kids Count Data Center, which compiled the data from the National Vital Statistics Reports of the National Center for Health Statistics (NCHS). This paper utilizes the raw data on the number of births by age group and reporting area for the years 1990-2015. The birth data was reported by all states in every year.

3. Demographics

Yearly state-level teenage population data disaggregated by sex, race, and ethnicity is compiled by the CDC WONDER online database from the NCHS. There are four racial categories reported in the dataset: "American Indian or Alaska Native", "Asian Pacific Islander", "Black or African American", and "White" as well as two ethnic categories "Hispanic" and "Not Hispanic." Using the WONDER data, five categories were created for this report: Asian Pacific Islander (API), Native Alaskan/American, Black Non-Hispanic, White Non-Hispanic, and Hispanic. API and Native populations make up a very small portion of the population in most states. The racial and ethnic composition of states is included as a time-varying state control to account for differences in abortion behavior among the groups. U.S. level data on abortion for the 15-19 year old age group shows Blacks as consistently having the highest abortion rates, followed by Hispanics, then Whites during the period examined in this study. Overall age-specific population data by state comes from the same source and is the sum of each racial and ethnic category

4. Abortion and Birth Rates

Abortions and birth rates for the two age groups analyzed, 15-17 and 18-19, are calculated by the author using the CDC and NCHS data, respectively. The abortion and birth data are divided by the population for each age group to create the abortion and birth rates. Figures 4 and 5 of the Appendix compare average abortion and birth rates for the two age groups over the 1990-2015 period. Annual averages are calculated as the simple means of the all states included in the analysis that reported data that year. The graphs show higher rates of abortion and birth for 18-19 year-olds compared to 15-17 year-olds for the entire period as well as corresponding downward trends for both groups.

5. Laws and Legal Coding

The coding of the laws included in this study was done by the author and may differ slightly from other papers. Data on these laws and the timing of their implementation were compiled from several sources. The information primarily comes from various state and policy reports by the National Abortion Rights Action League (NARAL), AGI, the Kaiser Family Foundation, and Kearney & Levine (2015). These sources were supplemented by the author's reading of the relevant statutes and court documents.

Parental involvement laws apply to unemancipated minors with the exception of Delaware, Montana, and South Carolina. The Delaware and Montana laws only applied to those under 16, and the South Carolina law to those under 17. Because of this discrepancy, these states are excluded from the analysis. There are two types of involvement laws that states can enforce: parental consent and parental notice, with consent being the more restrictive of the two. A binary dummy variable indicates if each law was in effect in a given state for a given year. The consent and notice variables are mutually exclusive – if a state is coded as a consent state, it is accordingly coded as a non-notice state. This allows for the interpretation of the individual impact of the implementation of a notice law versus a consent law.

Figures 1 and 2 in the Appendix provide a spatial representation of the overall increase in consent and notice laws from 1990 to 2015. The number of states with consent laws increased from 11 in 1990 to 25 in 2015. The corresponding increase for notice laws was from 5 to 12. Figure 3 offers

more detail regarding the yearly changes in the laws for the states included in the scope of this analysis and indicates the share of states that had a law in a given year. A summary of when parental consent and notice laws were enacted in each state through 2015 can be found in Table 2 of the Appendix.

In addition to parental involvement laws, several other laws and policies are included in the regression model as controls.

i. Mandatory delay laws require anyone seeking an abortion to wait a specified amount of time (typically 24 hours but some states require only 8 hours or as many as 72 hours) between pre-abortion counseling and the actual procedure. A binary indicator of a state's mandatory delay policy is included as a control. A state with any mandatory waiting period in a given year is coded as a 1 for the purposes of this paper.
ii. The level of state Medicaid coverage of abortions is included as another policy control variable. The 1976 Hyde Amendment bars the use of federal funds on abortion services except "when the procedure is necessary to save the life of the mother or if the pregnancy is the result of rape or incest." Several states have opted to extend their state Medicaid funding to cover abortions beyond the narrow cases outlined in the Hyde Amendment. The additional coverage afforded to Medicaid users differs by state, but in this paper a state is considered an adopter if they cover any abortion beyond the Hyde requirements.
iii. The final policy variable used in the regressions as a control is the state-level expansion of Medicaid family planning services to low-income individuals of reproductive age who do not qualify for Medicaid. States can expand coverage by obtaining either 5-year renewable Section 1115 waivers from the federal government or, beginning in 2010, State Plan Amendments (SPA) not subject to time limits. Unlike the first two policies which specifically target abortion, this policy controls for differing accessibility to preventative services, such as contraception and sexual health counseling, that may impact abortion and birth at the earlier decision node prior to pregnancy. An important note: some states specifically exclude minors from being able to take advantage of these programs. Therefore, a state with a 1115 waiver or SPA that includes minors is coded as an implementation state in the estimations. For the purposes of the Difference-in-Difference-in-Difference model, all waivers and SPAs that explicitly exclude minors are coded as 1s

for 18-19 year-olds that constitute the control group and 0s for the 15-17 year-olds that are the treatment observations.

The model used in this paper estimates within state variation, and therefore what is important for the analysis is whether or not a state made changes to these policies during the period under study. See Table 3 of the Appendix for a list of states that enacted or repealed each of these laws/policies between 1990 and 2015. The table shows that except for Medicaid expansion, numerous states (14-25) introduced changes in each of the other four laws and policies. However, the Medicaid variable is still included in the analysis because of the potential influence it may have on those states that do change.

6. Economic Controls

The state level data on unemployment, the number of Medicaid beneficiaries, and welfare benefits used in this paper come from the University of Kentucky Center for Poverty Research's National Welfare Dataset. The unemployment rate and the number of people enrolled in Medicaid are used as time varying indicators of economic wellbeing within a state. AFDC/TANF monthly benefits for a family of three is used as a control, as the level of assistance for families has the potential to influence the abortion decision. AFDC/TANF benefit data was adjusted for inflation by the author using CPI data from OECD, indexed for 2015.

7. Interstate Travel Controls

This paper attempts to control for the impact of interstate travel on the results. Because the abortion data is observed by state of occurrence, it is necessary to control for the possibility of inflated abortion rates observed in states without a parental involvement law due to incoming minors from other states. A variable indicating the number of possible "migration states" is included in model (4) of the abortion regression. A state is considered a "migration state" for an observation state *without* a law if it:

1. *Has* either a consent or notice law in place when the observation state *does not*
2. Is contiguous with the observation state or its population center is within 400 miles of the observation state's population center.

A travel control is also used in the birth regressions, but as this data is observed by state of residence, it is constructed somewhat differently. To account for minors leaving their state of

residence to obtain abortions, a variable indicating the number of possible "recipient states" is included in model (4) of the birth regression. Analogous to the "migration states," a state is considered a possible "recipient" for an observed state *with* an involvement law if it:

1. *Does not* have an involvement law in place when the observation state *does*
2. Is contiguous with the observation state or its population center is within 400 miles of the observation state's population center.

Population centers are based on the 2000 census and the distances were calculated using the "geosphere" function in R. The paper includes states within 400 miles based on the results of Meyers et. al, who find that the maximum effect of parental involvement laws occurs at avoidance distances of 400 miles. This suggest that minors are unable or unwilling to travel farther than this to obtain an out-of-state abortion.

8. Abortion Providers

Data on the number of abortion providers per 1000 minors is included in column (5) of the difference-in-difference model. This data comes from the AGI census of abortion providers, which as mentioned previously are only for the years 1992, 1996, 2000, 2005, 2010, 2011, and 2014 (Jones & Kooistra, 2011 ; Jones & Jerman, 2014) As a result, the inclusion of this data significantly restricts the number of observation years.

IV. Theory

This paper examines the impact of parental consent and notice laws on minors' pregnancy resolution. There are two competing theories regarding teenage sexual behavior – the classical rational behavior model (Levine, 2003; Kane & Staiger, 1996) and a random behavior model. The random behavior model treats teenagers' fertility decisions as exogenous and random, arguing that teenagers often either lack necessary information or do not make the necessary connections that would elicit the rational response (Paton 2006). The review of the literature presented in section II provides compelling evidence that the rational behavior model does not accurately depict minors' sexual decision making. (Blum et al. 1987, Stone & Waszak 1992; Blum et al, 1987 ; Colman et

al., 2013). The majority of the literature points to interstate travel to obtain an abortion, not preventative sexual precaution, as the primary method of response by minors to the introduction of involvement laws. The analysis in this study adopts the random behavior model and is therefore primarily interested in the choices teenagers make, once pregnant, in the context of the prevailing laws in their state of residence and neighboring territories.

Previous studies using pooled time series and cross sectional data do not consider the differential impacts of the two types of parental involvement laws – consent and notice. Consent and notice represent two 'tiers' of involvement laws with consent being the harshest restriction. States with consent laws allow parents or legal guardians veto power over their child's abortion decision. Notice laws, on the other hand, maintain minors' agency and only require that the relevant party be made aware of the decision. This is not to say that notice laws do not impose an additional burden for minors seeking abortions, but to note that they may do so to a lesser extent than consent laws. The results found by Joyce and Kaestner (1996), mentioned in section II, provide possible preliminary empirical support for this theory.

As such, this paper seeks to provide insight into the possible differential impact of the two types of parental involvement laws, focusing on the impact on pregnancy resolution rather than changes in prevention behavior. Previous studies that do not distinguish between notice and consent requirements may be masking this heterogeneity. The impact of consent laws on pregnancy resolution decisions could potentially be biased downward by the relatively less impactful notice laws.

V. Empirical Models

This paper employs a quasi-experimental research design using pooled cross sectional and time series data. Double and triple difference models are used to analyze the distinct impacts of parental consent and notice requirements on minor abortion and birth behavior.

A Difference-in-Difference (DD) model exploiting state and year variation is used to estimate the changes to minors' abortion and birth rates before and after an involvement law is

implemented. The basic model follows a similar structure to those used in previous papers (Levine, 2003; Meyers & Ladd, 2017). Regressions are estimated for the combined "involvement" variable as well as

$$(1)\ \ln(Abortion_{st}) = \alpha + \beta_1 Involvement_{st} + \lambda X_{st} + \Upsilon_t + \tau_s + \varepsilon_{st}$$
$$(2)\ \ln(Abortion_{st}) = \alpha + \beta_1 Consent_{st} + \beta_2 Notice_{st} + \lambda X_{st} + \Upsilon_t + \tau_s + \varepsilon_{st}$$

$$(3)\ \ln(Birth_{s(t+1)}) = \alpha + \beta_1 Involvement_{st} + \lambda X_{st} + \Upsilon_t + \tau_s + \varepsilon_{st}$$
$$(4)\ \ln(Birth_{s(t+1)}) = \alpha + \beta_1 Consent_{st} + \beta_2 Notice_{st} + \lambda X_{st} + \Upsilon_t + \tau_s + \varepsilon_{st}$$

Where the two outcome variables, $Abortion_{st}$ and $Birth_{s(t+1)}$, represent the abortion rate for minors aged 15-17 in state ***s*** and year **t** and the birth rate for minors aged 15-17 in state ***s*** and year *t+1,* respectively. The birth rate is evaluated in the year *t+1* to properly account for the fact that births would take place anywhere from three to eight months after abortions. Individuals may have given birth in year t+1 but their abortion decision fell in year t. Therefore, they were impacted by the law in place during the previous time period. The natural log of the dependent variables is taken so coefficients can be interpreted as percent changes.

$Involvement_{st}$, $Consent_{st}$, and $Notice_{st}$ are the explanatory variables of interest. $Involvement_{st}$ is a binary variable that indicates whether any parental involvement law (either consent or notice) was in effect in state, *s,* in year, *t.* Similarly, $Consent_{st}$ and $Notice_{st}$ are binary variables that indicate whether a parental consent or parental notice law was in effect in state, *s*, in year, *t.* These two variables are independent of one another –- a state where *Consent* = 1 in year *t* cannot also have *Notice =1* in that same year.

The vector X_{st} includes the state and time variant demographic, economic, welfare, and policy controls that vary by state and year as outlined in section III. Summary statistics for all variables can be found in Table 1. Υ_t and τ_s represent state and year fixed effects, respectively. Υ_t captures all observable and unobservable constant state characteristics and τ_s captures all year specific characteristics across all observation states that impact the outcome variables. Therefore, policy variables are identified by changes within states and

over time. The model is weighted by 15-17 year-olds state population and standard errors are clustered by state.

A Difference-in-Difference-in-Difference (DDD) specification is estimated using teenagers aged 18-19 as the comparison control group. The DDD estimate is used as a confirmation of the causal impact of involvement laws and the two fertility outcomes. By including an additional level of comparison, the triple difference estimate is able to control for unobserved factors that could bias the treatment effect.

The key assumption of the DDD model is that the control and treatment groups are similar to one another and follow parallel trends, absent treatment (adoption of an involvement law). Teens aged 18-19 serve as an effective control group for this research because, as legal adults, they are not subject to the parental control. Other than this legal distinction, there is nothing that particularly distinguishes the two groups from one another. They are close enough in age that they have plausibly similar behaviors. In fact, reports and statistics published regarding trends in teen pregnancy, birth, and abortion often look at the combined age group of 15-19 (Thomas & Livingston, 2019; Kost et al., 2017). Similarly, many empirical studies on adolescent sexual health and behavior do not distinguish between the two groups (Haas-Wilson, 1996; Medoff, 2009; Colman et al., 2013). Figures 3 and 4 in the Appendix plot the average abortion and birth rates for the two groups over time. As expected, based on previous studies and statistics, 18-19 year-olds have consistently higher abortion and birth rates than 15-17 year-olds. Importantly, these graphs show similar declines in both rates for the two age groups over time. Therefore, 18-19 year-olds are considered to be a good control group for comparison with the 15-17 year-olds.

The preferred specification of the DDD model is as follows:

$$\textbf{(1)}\quad \ln(A_{ast}) = \beta_1 C_{st} + \beta_2 N_{st} + \beta_2 T_a + \varphi_1(C_{ast} * T_a) + \Phi_1(N_{ast} * T_a) + \zeta_1(T_a * \tau_s) + \zeta_2(T_a * \Upsilon_t) + \lambda X_{ast} + \Upsilon_t + \tau_s + \varepsilon_{ast}$$

$$\textbf{(1)}\quad \ln(B_{as(t+1)}) = \beta_1 C_{ast} + \beta_2 N_{ast} + \beta_2 T_a + \varphi_1(C_{ast} * T_a) + \Phi_2(N_{ast} * T_a) + \zeta_1(T_a * \tau_s) + \zeta_2(T_a * \Upsilon_t) + \lambda X_{ast} + \Upsilon_t + \tau_s + \varepsilon_{ast}$$

Where the two outcomes variables, $Abortion_{ast}$ and $Birth_{as(t+1)}$, represent the abortion and birth rates for age group (15-17 vs 18-19), *a,* in state, *s,* and at time, *t* and *t+1,* respectively. As in the double difference model, $Consent_{ast}$ and $Notice_{ast}$ are binary indicators of whether a parental consent or notice law was in place for state, *s,* and at time, *t.* X_{ast} is a vector of the state and time varying controls. As noted before, the policy control for state family planning expansion differs for the two age groups in some states. Υ_t and τ_s include state and year fixed effects. T_a is a binary indicator that is equal to 1 when the observed outcome corresponds with the treatment group (15-17 year-olds) and 0 for the control group (18-19). The coefficients Φ_1 and Φ_2 are the DiD estimators of interest. Φ_1 estimates the effect of consent laws on minors relative to older teens controlling for unobservable effects captured by the age-year ($T_a * \Upsilon_t$) and age-state ($T_a * \tau_s$) interaction. Φ_2 provides the same interpretation for notice laws. This model is also weighted by state 15-17 year old population and uses robust standard errors clustered by state. In addition to the preferred model presented above, other DDD variations were estimated.

VI. Results

Difference-in-Difference

Abortion Rate

Table 4 in the Appendix summarizes the regression results for the difference-in-difference regressions on the natural log of the minor abortion rate -- Panel A for the single *Involvement* variable and Panel B for the models with separate *Consent* and *Notice* variables. Each column presents the estimate for a different regression specification with all of the models including state and year fixed effects. The estimated effects of *Involvement* and *Consent* are statistically significant and negative in every specification while *Notice* remains insignificant in all but the fifth model. Column (1) reports the results of a simple regression of the policy variables on the abortion rate without any time varying state controls. Column (2) includes the demographic and economic controls, and column (3) adds policy controls. The addition of each set of control variables in column (2) and (3) incrementally reduce the estimated individual effects of the policies. Importantly, and as expected, the estimated effects of *Consent* in Panel B are greater than those for *Involvement* in Panel A by roughly 2 percentage points across the specifications.

The fourth (4) model is the preferred model as it incorporates all relevant control variables and accounts for interstate travel which has been shown to be critical to results in previous papers. The small change in the coefficients between the third (3) and fourth (4) models may reflect the imperfect nature of the interstate travel variable used in this analysis. Nevertheless, this remains the superior model. Panel A finds that on average *Involvement* laws decreased minor abortion rates by a statistically significant 12.9%. This finding is in line with previous research (Ohsfeldt & Gohmann, 1994 ; Haas-Wilson, 1996). *Consent* laws are estimated to have approximately twice the impact of *Notice* laws, resulting in a statistically significant 14.7% decline in minor abortion rates, while notice laws have a smaller (7.1%) and statistically insignificant impact. These results indicate that previous studies that do not differentiate between the two laws may have been masking this heterogeneity and biasing their estimates. Abortion outcomes attributed to *Involvement* laws appear to be primarily driven by the impact of *Consent* laws with *Notice* laws having a moderating effect on the size of the *Involvement* coefficient.

The fifth model includes a time varying state control on the number of abortion clinics per 1000 minors to capture changes in abortion access within a state. However, because this data is only available for 10 of the 26 years, the scope is significantly more limited. The change in coefficients from model (4) to model (5) is likely not caused by the explanatory power of the provider variable, but rather by the reduction in observations. Therefore, the results presented for model (4) remain the preferred estimates.

Birth Rate

Table 5 in the Appendix reports the estimated effects of the involvement laws on the natural log of minor birth rates with a one-year lag. The same five specifications are used as in the abortion regression and similarly, in each specification, the consent laws have a large and statistically significant impact and the notice laws do not. However, unlike the abortion results, the singular *Involvement* variable is insignificant in most specifications. The estimated impacts of the variables change very little across the first three columns -- the coefficient on *Consent* remains positive, statistically significant, and fluctuates between 0.122 and 0.124. *Involvement* coefficient is positive, but insignificant in the first two models, while *Notice* is always insignificant and slightly

negative. The addition of the interstate travel controls in Model (4) lowers the estimated effect of *Consent* from 0.122 to 0.106 indicating that access to non-implementing neighboring states does influence birth outcomes as found in Meyers (2017). Model (4) with all the control variables other than providers therefore the preferred specification also for birth rates. In this specification, the *Involvement* variable is still positive but statistically insignificant. But when separated, consent laws are estimated to increase the birth rate by a statistically significant 10.6%, nearly triple the response of the combined involvement variable (3.9%). As in the abortion regression results, the *Consent* requirement has an effect on minors' outcomes, while *Notice* has little to no effect.

Difference-in-Difference-in-Difference

Table 6 of the Appendix provides a side by side comparison of the results from the preferred difference-in-difference models for minors and older teens. The table summarizes the differential impacts of *consent* and *notice* laws on minors' abortion and birth outcomes which are statistically significant and large impacts for consent, and small and statistically insignificant impacts for notice. Additionally, the table shows that for older teens, the impacts of both laws are statistically insignificant, as expected. Moreover, while the consent laws reduce minors' abortion rates by 14.7%, the impact on older teens is only a statistically insignificant 1.2% decline. Similarly while minor birth rates increase by 10.6% as a result of consent laws, the effect on older teens is a statistically insignificant 3.6 % increase. This indicates that the estimated impacts of these laws on minors' abortion and birth rates are in fact causal. A DDD regression of the two groups is modeled to further verify this finding.

Table 7 displays the results of the DDD regression estimates for abortion and birth rates of the preferred model which includes the time varying state controls from the fourth (4) specification of the DD model in addition to state and year fixed effects that can vary between the treatment and control groups. The effect of *consent* laws is found to be even larger than predicted in the double difference model. A state that implements a a consent law is estimated to experience a decline in minor abortion rates by an average of 16.6% relative to 18-19 year-olds. The relative magnitudes of the coefficients on consent and notice remain consistent between the DD and DDD models with notice remaining insignificant. Looking at the second column in Table 7, consent laws are still found to have a statistically significant positive impact on birth rates,

though the DiD estimator is less than half the size it was in the double difference. This is because there is a common trend between the treatment and control groups that is netted out in the DDD. As seen in DD Table 6, while statistically insignificant, the control group does have a positive 0.036 estimation. This is likely caused by 18 year-olds in the control group who were subject to the restrictions of the parental involvement laws during pregnancy as 17 year-olds. Therefore, future studies would benefit from a study which excludes 18 year-olds from both the treatment and control groups to eliminate this overlap. This was not possible to estimate with the data obtained for this paper. Additional specifications of DDD regressions with less time varying controls as well as state x year interactions can be found in Tables 8 and 9 of the Appendix.

VII. Conclusion

The results of this paper suggest that the recent slew of parental consent laws have had and will likely continue to have significant and consequential impacts on minors' fertility outcomes. The impact of notice laws alone, however, appear much smaller and were not able to be estimated with a high degree of confidence. Consent laws effectively transfer the decision-making authority from the pregnant minor to her parent or guardian. Although the aggregate US teen birth rates have been on a downward trend over the last three decades, increased implementation of restrictive abortion policies like those outlined in this paper have the potential to stop or even reverse this trend. Additionally, parental involvement restrictions do not live in a vacuum. They coexist with a range of other restrictive policies and laws that may continue to add to the effects of parental involvement.

While abortion is largely seen as one of the most polarizing and partisan issues in U.S. politics today, a historical analysis of the conservative pro-life movement indicates that it did not gain momentum until the 1980s, after *Roe* (McKeegan, 1993). The last few years alone have seen a significant shift in the legal landscape for abortion. The Supreme Court's ideological balance has moved to the right with the appointment of two conservative Justices in just the last four years. In 2019 alone, 12 states passed 25 abortion *bans* with various specifications. Several states have enacted extremely restrictive abortion policies, such as the Ohio "heartbeat bill" which sought to ban abortions once the heartbeat of the fetus is detectable ("What's Going on", 2019). The uptick

in these extreme provisions is seen by many as an attempt to relitigate abortion rights with the new conservative majority Supreme Court (Nash, 2019). In fact, at the time of this paper the Supreme Court is deliberating on *Russo v. June Medical Services LLC.* regarding a Louisiana law requiring doctors to have admitting privileges at a nearby hospital in order to perform abortions. This case has the potential to severely impact abortion access in several states and redefine the legal standards to which states must adhere (Smith, 2020).

Understanding the effects of abortion laws is imperative for both policymakers and the public at large. This paper identified the discrete impacts of consent and notice requirements on minors' abortion and birth rates by decomposing the analysis of parental involvement laws. This heterogeneous impact has potential implications for policymakers and individuals in states where these laws are in place or are being deliberated.

VIII. References

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IX. Appendix

TABLE 1
Summary Statistics

	weighted mean	s.d
Fertility Outcomes:		
Minors		
Abortion Rate (per 1000 15-17 year-olds)	9.986	6.802
Birth Rate (per 1000 15-17 year-olds)	24.262	11.276
Control Group (18-19 year-olds)		
Abortion Rate (per 1000 18-19 year-olds)	25.479	13.637
Birth Rate (per 1000 18-19 year-olds)	71.380	23.466
Involvement laws:		
Involvement	0.580	0.494
Consent	0.419	0.493
Notice	0.161	0.368
Racial and Ethnic Demographics:		
Minors		
Percent of Population that is:		
White, Non-Hispanic	62.271	17.046
Black, Non-Hispanic	15.075	9.527
Hispanic	17.236	15.340
Asian-Pacific Islander	4.362	5.226
Native American/Alaskan	1.055	2.214
Control Group (18-19 year-olds)		
Percent of Population that is:		
White, Non-Hispanic	61.970	17.039
Black, Non-Hispanic	14.973	9.691
Hispanic	17.351	15.215
Asian-Pacific Islander	4.685	5.153
Native American/Alaskan	1.013	2.110
Economic & Welfare Control Variables:		
Unemployment Rate	6.119	1.927
Percent of Population on Medicaid	15.142	5.005
TANF/AFDC Benefit Family of 3 ($2015)	546.793	228.816
Fertility Policy Controls:		
Mandatory Delay Law	0.389	0.488
Medicaid Coverage for Abortion	0.344	0.475
Medicaid Family Planning Waiver (including <18)	0.249	0.432
Medicaid Family Planning Waiver (all)	0.305	0.460

TABLE 2
State Parental Notice and Consent Laws Through 2015

State	Law	Year(s) Enacted
Alabama	Consent	1987
Alaska	Notice	2011
Arizona	Consent	2003
Arkansas	Notice	1989
Colorado	Notice	1998-1999 ; 2003
Florida	Notice	1999-2002 ; 2005
Georgia	Notice	1991
Idaho	Consent / Notice	2000-2003 ; 2007 / 2004-2006
Illinois	Notice	2010
Indiana	Consent	1982
Iowa	Notice	1997
Kansas	Notice / Consent	1992-1996 / 1997
Kentucky	Consent	1989
Louisiana	Consent	1981
Maine	Consent	1989
Maryland	Notice	1992
Massachusetts	Consent	1981
Michigan	Consent	1991
Minnesota	Notice	1990
Mississippi	Consent	1993
Missouri	Consent	1985
Nebraska	Consent	1991
New Hampshire	Notice	2012
North Carolina	Consent	1995
North Dakota	Consent	1981
Ohio	Consent	1990
Oklahoma	Consent	2001
Pennsylvania	Consent	1994
Rhode Island	Consent	1982
South Dakota	Notice	1997
Tennessee	Notice / Consent	1989 / 1995 ; 1999
Texas	Consent	2000
Utah	Consent	2006
Virginia	Consent	1997
West Virginia	Notice	1984
Wisconsin	Consent	1992
Wyoming	Consent	1989

*only states with laws included in the analysis listed
Sources: compiled by the author from NARAL, AGI, the Kaiser Family Foundation, Kearney & Levine (2015)

TABLE 3
State Fertility Related Policy Changes 1990-2015

Consent	Notice	Delay	Medicaid	Family Planning
(14)	(15*)	(24*)	(5*)	(20*)
Arizona	Alaska	Alabama	D.C.*	Arkansas
Idaho	Colorado	Arizona	Minnesota	California
Kansas	Delaware*	Arkansas	Montana*	Connecticut
Michigan	Florida	Florida	New Mexico	Illinois
Mississippi	Georgia	Georgia	North Carolina	Indiana
Nebraska	Idaho	Indiana		Maryland
North Carolina	Illinois	Kansas		Minnesota
Oklahoma	Iowa	Kentucky		Mississippi
Pennsylvania	Kansas	Louisiana		New Hampshire
Tennessee	Maryland	Michigan		New Mexico
Texas	Montana*	Minnesota		New York
Utah	New Hampshire	Mississippi		North Carolina
Virginia	South Dakota	Missouri		Ohio
Wisconsin	Tennessee	Nebraska		Oregon
	Utah	North Carolina		Pennsylvania
		North Dakota		South Carolina*
		Ohio		Vermont
		Oklahoma		Virginia
		Pennsylvania		Washington
		South Carolina*		Wisconsin
		Texas		
		Virginia		Alabama†
		West Virginia		Georgia†
		Wisconsin		Iowa†
				Louisiana†
				Michigan†
				Missouri†

* Delaware, Montana, and South Carolina involvement laws applied only to those under the ages of 17 and 16, respectively and were excluded from the regression analysis. The District of Columbia was excluded from analysis due to data issues.
† Family Planning Waiver did not apply to those under 18

Sources: compiled by the author from NARAL, AGI, the Kaiser Family Foundation, Kearney & Levine (2015)

TABLE 4
Impact of Parental Involvement Laws on Minor Abortion Rates 1990 - 2015

	(1)	(2)	(3)	(4)	(5)
Panel A					
Parental Involvement Law *(either consent or notice)*	-0.193*** (0.056)	-0.162** (0.056)	-0.128** (0.056)	-0.129*** (0.049)	-0.195*** (0.045)
Panel B					
Consent Law	-0.213*** (0.054)	-0.183*** (0.054)	-0.147*** (0.055)	-0.147*** (0.053)	-0.208*** (0.053)
Notice Law	-0.108 (0.076)	-0.094 (0.083)	-0.076 (0.072)	-0.071 (0.067)	-0.111** (0.054)
State FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Demographic Controls	no	yes	yes	yes	yes
Economic Controls	no	yes	yes	yes	yes
Policy Controls	no	no	yes	yes	yes
Interstate Travel Control	no	no	no	yes	yes
State Abortion Providers	no	no	no	no	yes
Observations	1031	1030¶	1030	1030	396§

*Significance. codes: p< 0.01 '***' 0.05 '**' 0.1 '*'*

Notes: Summarized coefficient estimates for weighted least squares model with state and year fixed effects. The dependent variable is the logged abortion rate by state of occurrence. Each entry represents the estimated coefficient with its standard error reported in parenthesis for a different WLS model with the indicated covariates. The results in the first panel are for models in which parental involvement was the key independent variable and the results *in the second panel for models that include two policy variables: consent and notice.. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.*

¶ Data on the Medicaid beneficiaries is missing for Hawaii in 1997.
§ Data on abortion providers was only available for ten years (1991,1992, 1995, 1996, 1999, 2000, 2005, 2008, 2011, 2014).

TABLE 5
Impact of Parental Involvement Laws on Minor Birth Rates (lagged)

	(1)	(2)	(3)	(4)	(5)
Panel A					
Parental Involvement Law	0.056	0.062	0.055*	0.039	0.052*
(either consent or notice)	(0.049)	(0.039)	(0.032)	(0.030)	(0.028)
Panel B					
Consent Law	0.122*	0.124**	0.122***	0.106***	0.107***
	(0.048)	(0.038)	(0.035)	(0.031)	(0.031)
Notice Law	-0.015	-0.010	-0.012	-0.035	0.012
	(0.035)	(0.026)	(0.024)	(0.031)	(0.030)
State FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Demographic Controls	no	yes	yes	yes	yes
Economic Controls	no	yes	yes	yes	yes
Political & Policy Controls	no	no	yes	yes	yes
Interstate Travel Control	no	no	no	yes	yes
State Abortion Providers	no	no	no	no	yes
Observations	1222	1221¶	1195¥	1195	470§

*Significance. codes: p< 0.01 '***' 0.05 '**' 0.1 '* '*

Notes: Summarized coefficient estimates for weighted least squares model with state and year fixed effects. The dependent variable is the logged abortion rate by state of occurrence. Each entry represents the estimated coefficient with its standard error reported in parenthesis for a different WLS model with the indicated covariates. The results in the first panel are for models in which parental involvement was the key independent variable and the results in the second panel for models that include two policy variables: consent and notice.. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.

¶ Data on the Medicaid beneficiaries is missing for Hawaii in 1997.
§ Data on abortion providers was only available for ten years (1991,1992, 1995, 1996, 1999, 2000, 2005, 2008, 2011, 2014).

TABLE 6
Parental Involvement Law Difference-in-Difference 15-17 vs 18-19 year-olds

	Abortion Rate		Birth Rate*	
	15-17	18-19	15-17	18-19
Consent Law	-0.147***	-0.012	0.106***	0.036
	(0.053)	(0.055)	(0.031)	(0.022)
Notice Law	-0.071	-0.028	-0.035	-0.034
	(0.067)	(0.092)	(0.030)	(0.021)
State FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Demographic Controls	yes	yes	yes	yes
Economic Controls	yes	yes	yes	yes
Policy Control	yes	yes	yes	yes
Interstate Travel Control	yes	yes	yes	yes
State Abortion Providers	no	no	no	no
Observations	1030	1030	1195	1195

Notes: Summarized comparison of coefficient estimates for the preferred (4) weighted least squares model for the two indicated age groups. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.

** The birth rate is lagged*
¶ Data on the Medicaid beneficiaries is missing for Hawaii in 1997.

TABLE 7
Triple Difference Estimates

	Abortion Rate	Lagged Birth Rate
Consent Law	-0.166***	0.046**
	(0.0398)	(0.019)
Notice Law	-0.073	-0.004
	(0.053)	(0.021)
State FE	yes	yes
Year FE	yes	yes
Demographic Controls	yes	yes
Economic Controls	yes	yes
Policy Controls	yes	yes
Interstate Travel Control	yes	yes
Treatment x Year FE	yes	yes
Treatment x State FE	yes	yes
State x Year FE	no	no
Observations	2062	2060

*Significance. codes: p< 0.01 '***' 0.05 '**' 0.1 '* '*

Each entry represents the difference in difference estimator with its standard error reported in parenthesis for a different DDD model with the indicated covariates. The did estimator in the first column measures the average effect of the indicated law on the abortion rate of the treatment group of 15-17 year-olds relative to the abortion rate of control group of 18-19 year-olds. The did estimator in the second column measures the average effect of the indicated law on the lagged birth rate of the treatment group of 15-17 year-olds relative to the lagged birth rate of control group of 18-19 year-olds. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.

TABLE 8
Triple Difference Estimates on Abortion Rate

	(1)	(2)	(3)	(4)	(5)
Consent Law	-0.155***	-0.164**	-0.167***	-0.166***	-0.155***
	(0.039)	(0.040)	(0.040)	(0.041)	(0.056)
Notice Law	-0.073	-0.073	-0.074	-0.072	-0.068
	(0.053)	(0.047)	(0.048)	(0.049)	(0.065)
State FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Demographic Controls	no	no	no	yes	yes
Economic Controls	no	no	yes	yes	yes
Policy Controls	no	no	yes	yes	yes
Interstate Travel Control	no	no	yes	yes	yes
Treatment x Year FE	yes	yes	yes	yes	yes
Treatment x State FE	no	yes	yes	yes	yes
State x Year FE	no	no	no	no	yes
Observations	2062	2062	2060	2060	2060

*Significance. codes: p< 0.01 '***' 0.05 '**' 0.1 '* '*

Each entry represents the difference in difference estimator with its standard error reported in parenthesis for a different DDD model with the indicated covariates. The did estimator measures the average effect of the indicated law on the abortion rate of the treatment group of 15-17 year-olds relative to the abortion rate of control group of 18-19 year-olds. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.

TABLE 9
Triple Difference Estimates on Birth Rate (lagged)

	(1)	(2)	(3)	(4)	(5)
Consent Law	0.012	0.023	0.024	0.046**	0.027
	(0.026)	(0.020)	(0.021)	(0.019)	(0.025)
Notice Law	-0.020	-0.006	-0.005	-0.004	-0.012
	(0.025)	(0.023)	(0.022)	(0.021)	(0.030)
State FE	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes
Demographic Controls	no	no	no	yes	yes
Economic Controls	no	no	yes	yes	yes
Political & Policy Controls	no	no	yes	yes	yes
Interstate Travel Control	no	no	yes	yes	yes
Treatment x Year FE	yes	yes	yes	yes	yes
Treatment x State FE	no	yes	yes	yes	yes
State x Year FE	no	no	no	no	yes
Observations	2444	2444	2390	2390	2390

*Significance. codes: 0.01 '***' 0.05 '**' 0.1 '* '*

Each entry represents the difference in difference estimator with its standard error reported in parenthesis for a different DDD model with the indicated covariates. The did estimator measures the average effect of the indicated law on the lagged birth rate of treatment group of 15-17 year-olds relative to the lagged birth rate of the control group of 18-19 year-olds. All standard errors are clustered at the state level and all specifications are weighted by the population of females aged 15–17 in each state and year.

Figure 1

Parental Involvement Laws in 1990

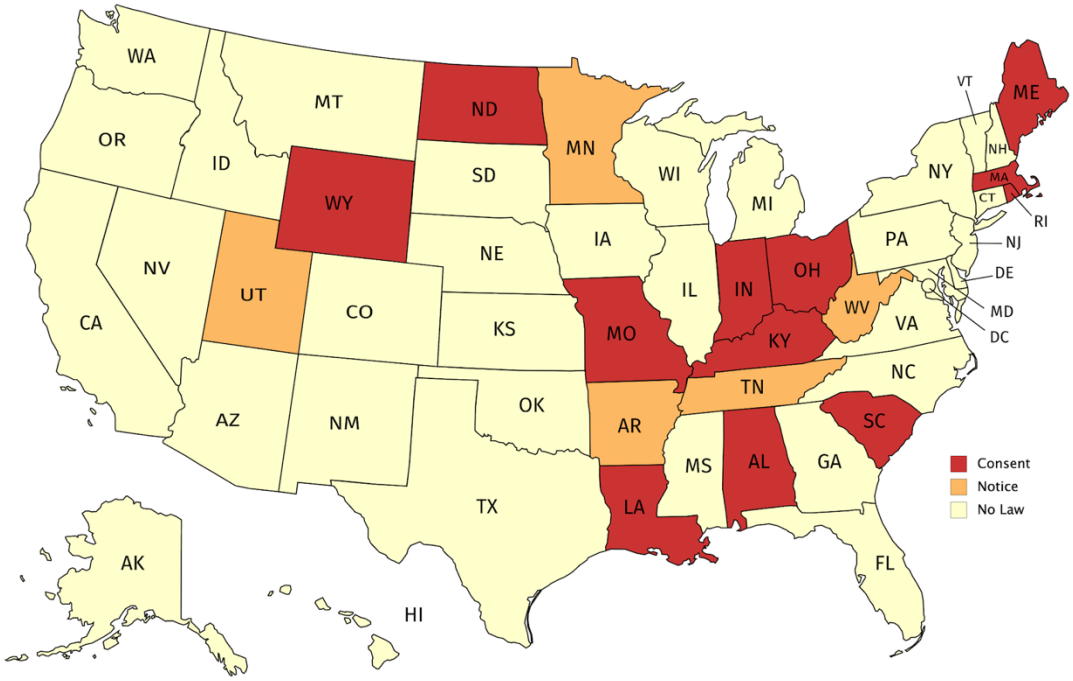
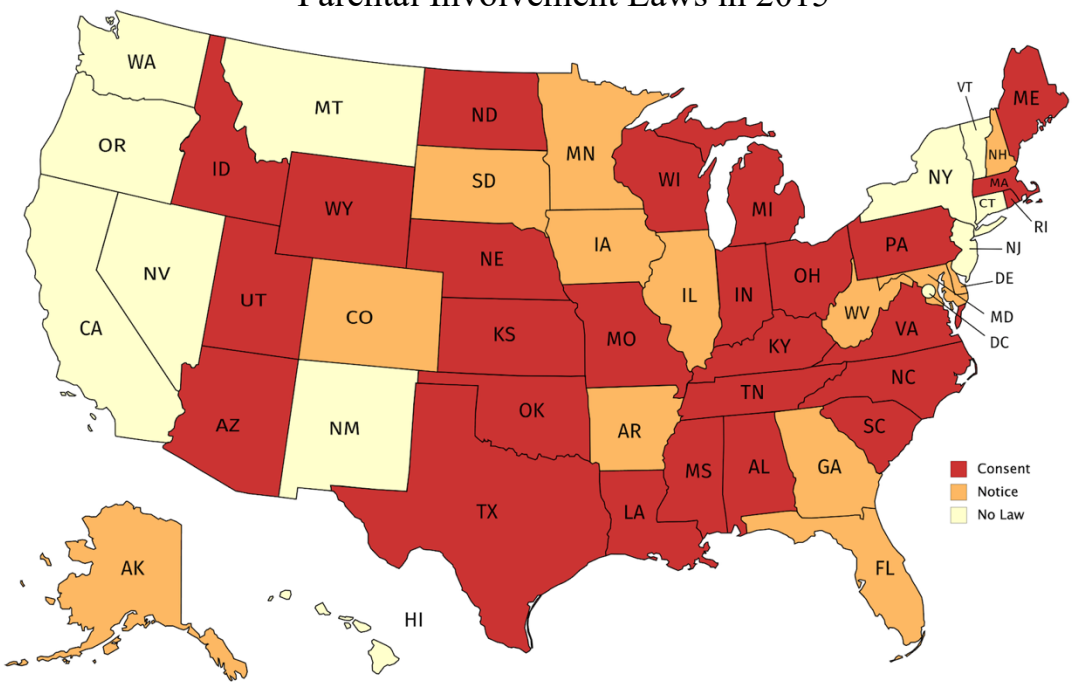


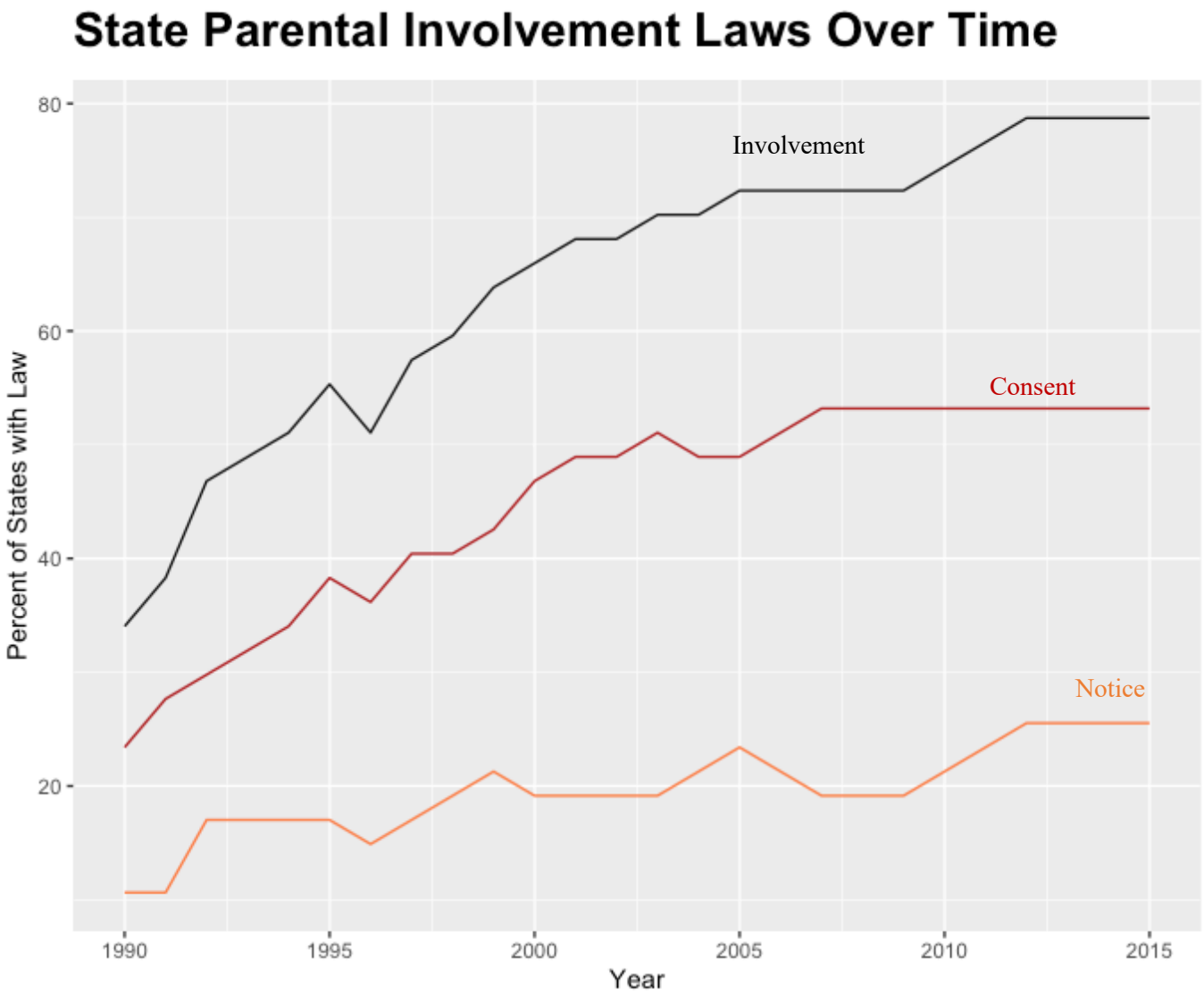
Figure 2

Parental Involvement Laws in 2015



Created by the author with data from NARAL, AGI, the Kaiser Family Foundation, Kearney & Levine (2015)

Figure 3



Created by the author with data from NARAL, AGI, the Kaiser Family Foundation, Kearney & Levine (2015)

Figure 4

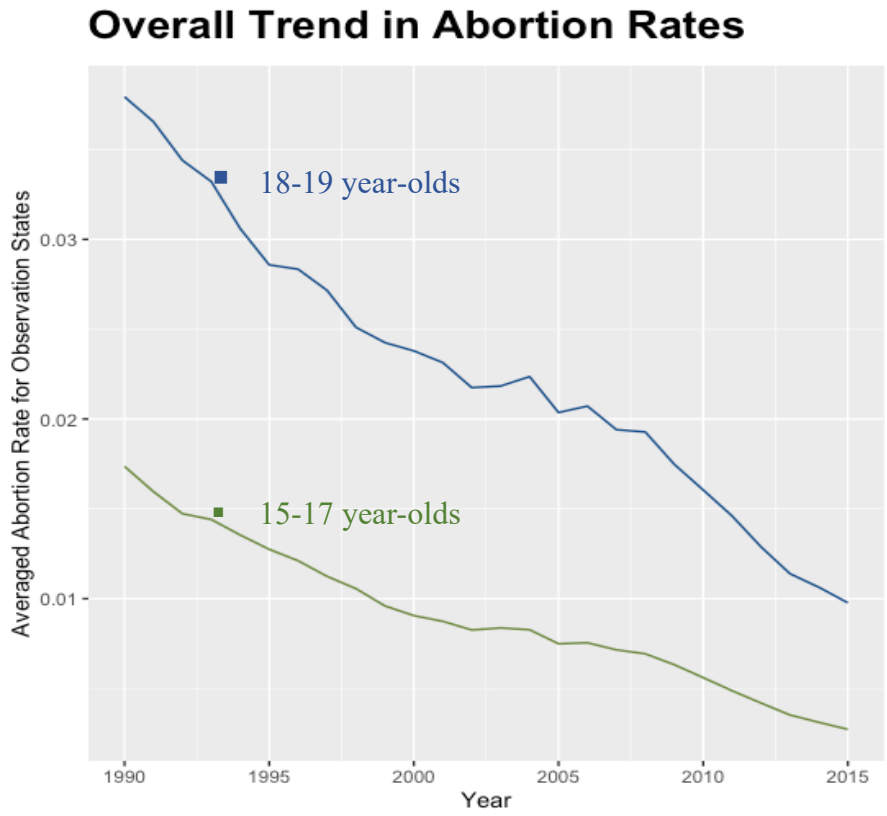
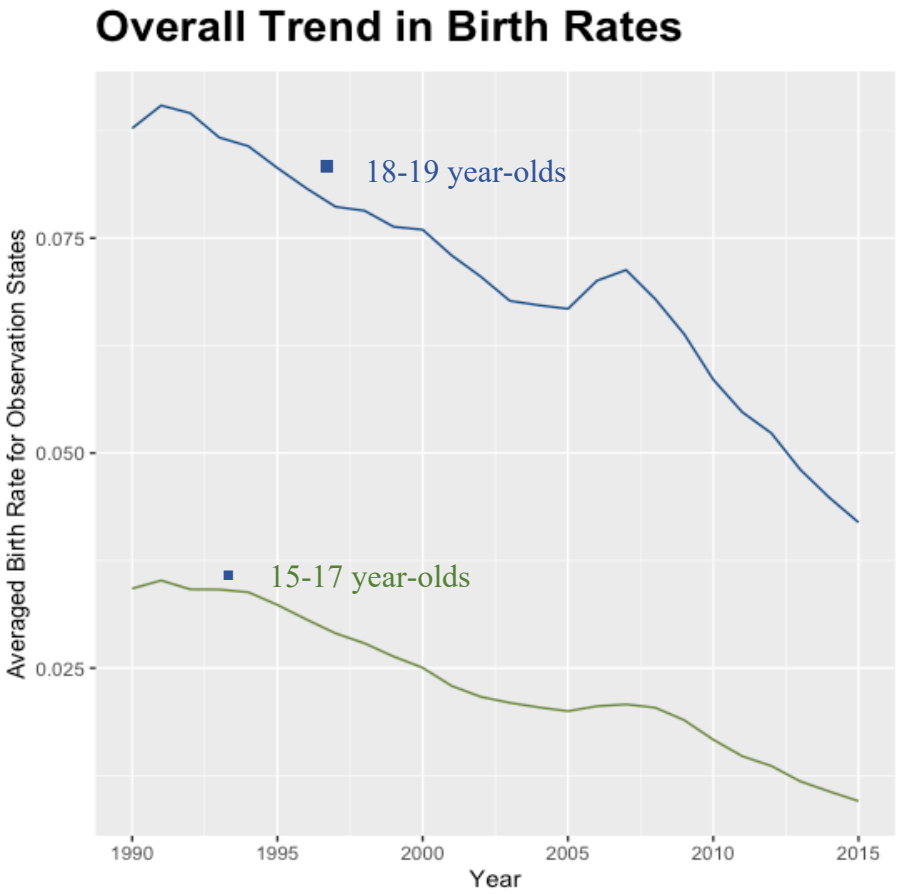


Figure 5



Created by the author with data from NARAL, AGI, the Kaiser Family Foundation, Kearney & Levine (2015)