THE IMPACT OF LEGAL ABORTION ON MATERNAL HEALTH: LOOKING TO THE PAST TO INFORM THE PRESENT

Sherajum Monira Farin
Lauren Hoehn-Velasco
Michael F. Pesko
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aDepartment of Economics, Georgia State University
Introduction
Motivation

- Abortion became legal in U.S in the 1960s/1970s in a state-by-state approach
- In 1973 Roe v. Wade decision legalized abortion nationally
- Legal abortion over this period has been demonstrated to affect a variety of economic outcomes ¹
  - Family formation, fertility, crime, and schooling
- Fewer studies consider whether legal abortion impacts maternal health? ²
  - Best available measures: maternal and abortion-related mortality

¹ Zabin et al. (1989); Angrist and Evans (1996); Levine et al. (1999); Donohue III and Levitt (2001); Kalist (2004); Guldi (2008); Foote and Goetz (2008); Ananat et al. (2009); Lahey (2014a,b); Myers (2017); Fischer et al. (2018), among others.
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In this study, we question:

1. Did legal abortion impact maternal and abortion-related mortality?
2. Does the impact of abortion differ by race?
Overview of the Present Study

• **Context:**
  - Focus on full legalization: repeal states—five states and DC—as well as the 1973 *Roe v. Wade* decision
  - Examine declines in maternal and abortion-specific mortality, 1959-1980

• **Strategy:**
  - Primary data from NCHS Multiple Cause of Death Files and population data from U.S. Census (IPUMS)
  - *Event-study design* with both *Two-Way Fixed Effects (TWFE)* and Sun and Abraham (2020) *Interaction-Weighted (IW) Estimator*
OVERVIEW OF THE PRESENT STUDY

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**Primary Finding:** Non-white women benefit the most from legal abortion

1. Reduced non-white maternal mortality by 30-40%
2. Non-white abortion-specific mortality declines by 30-60%

- Unable to disentangle changes in white abortion-related mortality from the secular decline
- Early state-level legalizations crucial—and find less of an impact of *Roe v. Wade* decision

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PREVIOUS LITERATURE AND CONTRIBUTION

1. Abortion Important for Economic Outcomes
   • Zabin et al., 1989; Angrist and Evans, 1996; Levine et al., 1999; Donohue III and Levitt, 2001; Bitler and Zavodny, 2001; Kalist, 2004; Oreffice, 2007; Hock et al., 2007; Guldi, 2008; Foote and Goetz, 2008; Donohue and Levitt, 2008; Lahey, 2014b; Myers, 2017; Fischer et al., 2018; Lindo et al., 2020; Jones, 2021

2. Abortion Restrictions Matter
   • Kane and Staiger, 1996; Joyce et al., 1997; Joyce and Kaestner, 2001; Levine, 2003; Klick and Stratmann, 2008; Sabia and Rees, 2013; Sabia and Anderson, 2016; Myers and Ladd (2020); Lindo and Pineda-Torres, 2021; Myers, 2021

3. Abortion Access Linked to Maternal Health/Mortality
   • Suggestive Trends in US: Cates et al., 1978; Bauman and Anderson, 1980; Grossman and Jacobowitz, 1981; Miller et al., 1988; Coble et al., 1992; CDC, 1999
   • Impact of Decriminalization in Mexico City: Betancourt (2017); Clarke and Mühlrad (2021)

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4 Other related literature: American Civil Rights Movement literature (e.g. Chay and Greenstone, 2000; Tamura et al., 2016; Thompson, 2019; Anderson et al., 2020); historical perspectives on maternal mortality (next slide)
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**Contribution:** One of the 1st studies to consider the impact of U.S. abortion legalization on maternal health
HISTORICAL BACKGROUND–MATERNAL MORTALITY

*Per 100,000 live births.

SOURCE: CDC (1999)

Maternal Mortality Decline Pre-1940

*Per 100,000 live births.

Maternal Mortality Decline Pre-1940

Jayachandran et al., (2010)
Sulfa drugs, 24-36%
Thomasson and Treber (2008)
Allowed for Hospital Delivery

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- Allowed for Hospital Delivery
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- Licensing of Midwives, 7-8%
- Albanesi and Olivetti, 2016
- Prenatal Care and Blood Banks
- Technological improvements
- Vacuum aspiration for abortion
- Monitoring high-risk pregnancies
  (Cutler and Meara, 2000)
- Legal Abortion

*Per 100,000 live births.
DECLINE IN MATERNAL MORTALITY, 1959-1980

Maternal Mortality, 1959-1980

Source: NVSS/CDC Multiple Cause of Death Files, 1959-1980.
DECLINE IN MATERNAL MORTALITY, 1959-1980

Maternal Mortality, 1959-1980

- All
- White
- Non-white
DECLINE IN MATERNAL MORTALITY, 1959-1980

Maternal Mortality, 1959-1980

- First Legal Abortion
- First Abortion Reform

Graph showing the decline in maternal mortality from 1959 to 1980, with distinct segments for all, white, and non-white categories.
DECLINE IN MATERNAL MORTALITY, 1959-1980

Maternal Mortality, 1959-1980

15
10
5
0


First Legal Abortion
First Abortion Reform
Roe v. Wade

All  White  Non-white
Abortion Deaths in the 1960s and 1970s

Share of Maternal Deaths Due to Abortion

- Share White
- Share Non-white

Key Events:
- First Abortion Reform
- First Legal Abortion
- Roe v. Wade
In 1973 Supreme Court notes that abortion “is now relatively safe” with “...mortality rates for women undergoing early abortions, where the procedure is legal, appear to be as low as or lower than the rates for normal childbirth” (Roe v Wade, 1973).
HISTORICAL BACKGROUND–LEGAL HISTORY
ABBREVIATED TIMELINE OF LEGAL ABORTION IN THE UNITED STATES

- **Abortion Legal Until Quickening**
- **1821** Connecticut Criminalize Abortion Services
- **Mid-1800s** Anti-Poisoning Statutes
- **Late-1800s** States Tighten Laws
ABBREVIATED TIMELINE OF LEGAL ABORTION IN THE UNITED STATES

- **1800**: Few Formal Legal Adjustments
- **1821**: Connecticut Criminalize Abortion Services
- **Mid-1800s**: Anti-Poisoning Statutes
- **Late-1800s**: States Tighten Laws
- **1850**: Few Formal Legal Adjustments
- **1900**: Few Formal Legal Adjustments
- **1950**
- **1965**
ABBREVIATED TIMELINE OF LEGAL ABORTION IN THE UNITED STATES

1800

1850

1900

1950

1965

1967

1969

1971

1973

Abortion Legal Until Quickening

**Mid-1800s** Anti-Poisoning Statutes

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**1821**
Connecticut Criminalize Abortion Services

**Late-1800s**
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**1967**
MPC Abortion Reform

**1969**
1st State Legalization in CA
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- **1821**: Countries Criminalize Abortion Services
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- **1950**: Few Formal Legal Adjustments
- **1965**: 1967 MPC Abortion Reform
- **1967**: 1st State Legalization in CA
- **1969**: Roe v. Wade Legal Nationally
- **1973**: 5 States + DC Legalize Abortion
- **1973**: 16 States Reform Abortion Laws
DATA AND EMPIRICAL STRATEGY
• Over 1966-1973, states liberalized abortion legislation: ⁴

1. **Reform states:** Sixteen states permit abortion under certain circumstances, 1966-1972
2. **Repeal (early-legal) states**: removed their criminal abortion laws and passed clear legal abortion, 1969-1971

- Five states plus DC
1. **Mortality Data**, 1959-1980
   - NCHS Multiple Cause of Death Files (NVSS/CDC and NBER)

2. **Population Composition**
   - U.S. Census data available from IPUMS (Ruggles et al., 2021)

3. **Births**
   - Bailey et al. (2016)

4. **Controls for Family and Fertility Policy**
   - *Unilateral divorce* — Wolfers (2006)
   - *Access to pill and minor’s access to pill* — Myers (2021)
**Main Outcomes: Mortality over 1959-1980**

- **Measures of Mortality:**
  1. *All-cause* maternal deaths
  2. *Narrow* abortion-specific deaths
  3. *Broad* abortion-specific deaths: using recategorized sepsis, hemorrhage, and ectopic pregnancies plus narrow abortion deaths

- **Two Specifics About Maternal Mortality:**
  1. Measure deaths per 100,000 reproductive-age females (15-44)
    - Instead of maternal deaths per birth
    - Fertility affected by abortion
  2. Use inverse hyperbolic sine (IHS) of mortality rate
    - *To capture proportional changes & maintain zeros*
    - In the appendix, we verify findings across other choices
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**Empirical Strategy**

Use an event-study specification for state $s$ and year $t = 1959, \ldots, 1980$:

$$M_{st} = \alpha + \sum_{m=-7}^{6} \beta_m \text{Legal Abortion}_{sm} + \mathbf{x}'_{st} \gamma + a_s + \eta_t + \epsilon_{st}$$

- $M_{st}$ – inverse hyperbolic sine of maternal mortality rate
- Legal Abortion$_{sm}$ indicator variables (=1), capturing passage of legal abortion in state $s$ during period $m = 0$
- $\mathbf{x}_{st}$ are state-level demographic controls – share of reproductive-age females 15-19 who are white, those non-white, and the log of the mean family income; and relevant fertility and family policy controls
- Fixed effects: state $a_s$ and year $\eta_t$
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Specifics of Event Study

- Problem: All States Treated (No Control Group)

1. **TWFE Estimator**
   - “bin” \( m = -7 \& m = 6 \) endpoints and omit -1 (Schmidheiny and Siegloch, 2020).

2. **IW Estimator**—from Sun and Abraham, 2020
   - Leave endpoints “unbinned,” and compare effect of early-legalization states to not-yet-treated Roe v. Wade States and omit -1
   - Deals with problems of TWFE (Callaway and Sant’Anna, 2020; Goodman-Bacon, 2021).

- Another issue: *Does mortality predict timing of legalization?*
  - Use a Cox proportional hazard model to show mortality does not predict timing
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Findings
Event Study: Non-white Mortality

Non-white Maternal Mortality

Narrow Non-white Abortion Mortality

| TWFE-No Controls | N= 1,122 | 95% CI |
| TWFE-Controls    | N= 1,122 | 95% CI |
| IW-Controls      | N= 765   | 95% CI |

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EVENT STUDY: WHITE MORTALITY

White Maternal Mortality

Narrow White Abortion Mortality

- TWFE-No Controls, N=1,122, 95% CI
- TWFE-Controls, N=1,122, 95% CI
- IW-Controls, N=765, 95% CI
Event Study: All Mortality

Maternal Mortality

Narrow Abortion Mortality

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Main Effect Isolated to Non-white Mortality
1. **Spillovers**: From early-legal or reform states

2. **Abortion Reforms**: Less important than legal abortion

3. **De facto Legalizations**: Potentially some effect, but not large

4. **Placebo and Misclassification Tests**
   - *Placebo test* using all-cause male mortality for those aged 15 to 44
   - *Test for Misclassification* using overall all-cause female mortality for women aged 15-44

5. **Difference-in-differences**
   - Show ten variations of main specification
   - Check interactions: little interacting impact of other state-level policies
Roe v. Wade Effect versus Early Legalizations

• Main identification strategy relies on early-legal states (IW specification)

• Examine whether Roe v. Wade has a noticeable impact
  i Already-treated states as controls in TWFE specification
  ii Proxy for demand for unsafe abortion using pre-reform mortality level
    • Assumption: states with ↑ demand for illegal (or unsafe) abortion should experience ↑ benefit from legal abortion
  iii Year-over-year changes in mortality
  iv Goodman-Bacon decomposition also verifies this issue

• Findings: All suggest early legalizations have a clearer impact on mortality
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Abortion Mortality: By Legal Status

- In 1973 abortion-related mortality had already fallen by
  1. 90% since 1959
  2. 87% since 1965
• Early-legalization states (CA, NY) also had the highest population of non-white women
  • Aligns with the unweighted findings as well
CONCLUSIONS
CONCLUSIONS: NON-WHITE WOMEN BENEFIT THE MOST

• **Primary Finding:** Non-white maternal health (measured by mortality) the most impacted by legal abortion
  
  1. Maternal: *Legal abortion reduced non-white maternal mortality by 30-40\%*
  2. Abortion-specific: Non-white abortion-related mortality declines by 30-60\%

• Aligns with narratives of the time (e.g., Gold, 2003), and other related studies (e.g., Joyce et al., 2013; Myers, 2017).
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1. Early state-level legalizations played a crucial role in non-white maternal mortality decline
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2. *White abortion-related mortality declines before legalization—difficult to disentangle legal abortion from this secular decline*
**Conclusions: Additional Findings**

1. Early state-level legalizations played a crucial role in non-white maternal mortality decline
   - Less noticeable effect of national legalization through *Roe v. Wade*

2. White abortion-related mortality declines before legalization—difficult to disentangle effect of abortion from this secular decline
   - **Why?** *De facto* access, *therapeutic* abortions, better poised to navigate the healthcare system, financial resources for international and domestic travel
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3. Delivery characteristics changed in the wake of legal abortion
CONCLUSIONS: ADDITIONAL FINDINGS

1. Early state-level legalizations played a crucial role in non-white maternal mortality decline
   - Less noticeable effect of national legalization through Roe v. Wade

2. White abortion-related mortality declines before legalization–difficult to disentangle effect of abortion from this secular decline
   - Why? *De facto* access, *therapeutic* abortions, better poised to navigate the healthcare system, financial resources for international and domestic travel

3. Delivery characteristics changed in the wake of legal abortion
   - Significant increase in the average maternal age - *showing clearest prevention of unwanted pregnancies for younger mothers*  

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4. aligns with the findings in Cates et al. (2003); Donohue III et al. (2009); Ananat et al. (2009)
1. **Worldwide** each year $\sim$4-13% of maternal deaths from unsafe abortion\(^5\)

- Abortion restrictions may produce higher than necessary abortion-related deaths
- Especially for disadvantaged groups who cannot travel or advocate for themselves in the medical system

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\(^5\) Singh and Ratnam, 1998; Haddad and Nour, 2009; Say et al., 2014
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   - Especially for disadvantaged groups who cannot travel or advocate for themselves in the medical system

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\(^5\) Singh and Ratnam, 1998; Haddad and Nour, 2009; Say et al., 2014
2. Maternal mortality in the United States

- U.S. maternal mortality higher than comparable settings
- Non-Hispanic black women suffer three times the maternal mortality of white women\(^6\)
- If *Roe v. Wade* were repealed today, abortion will depend on:
  1. State legal statues
  2. Ability to travel
  3. Self-advocacy in medical system (therapeutic abortions)
- Our research demonstrates that non-white women were the most affected by legal restrictions on abortion\(^7\)
- Potential for the racial gap in maternal mortality to widen further

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Thank you!
Comments very much appreciated
Email: lvlasco@gsu.edu
Appendix

Additional Background
Legal abortion important for non-white all-cause and abortion-related maternal mortality, maintains effect throughout robustness checks

- Physicians “saw women who needlessly suffered and died as a consequence of illegal abortion” (Rubin, 1994, pg. 71) with these physicians “disturbed that most of those women were poor and black” (Rubin, 1994, pg. 71).

- Prior to legal abortion—“a two-tiered abortion system emerged in which service depended on the class, race, age and residence of the woman. Poor and rural women obtained illegal abortions, performed by people, physicians and others, who were willing to defy the law out of sympathy for the woman or for the fee. More privileged women steadily pressed physicians for legal abortions and many obtained them” (Law et al., 1989, pg. 18).
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2. **White women may have experienced early-legal access**, potentially impacting mortality before full legalization

- “...class bias inherent in the psychiatric indications for therapeutic abortions” (Rubin, 1994, pg. 71).

- Inter-state travel was limited by economic means—“really only available to the small proportion of women who were able to pay for the procedure plus the expense of travel and lodging” (Gold, 2003, pg. 4)

Through travel or *de facto* access through therapeutic abortions
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Through travel or de facto access through therapeutic abortions
Sources of Abortion Before Legalization

1. Abortion through Travel
   - International—Japan, “Iron Curtain,” London, and some in Mexico
   - Domestic after early legalization

2. Therapeutic Abortion
   - Abortions to prevent physical and mental harm

3. Abortion Reforms
   - MPC provisions, and others

4. Illegal Abortion
WHERE DID *recorded* abortions occur? In 1972
Appendix

Additional Robustness
Robustness Checks: Spillover from Repeal, Reform States

- Check if control group is polluted through travel
- Remove states affected by these spillovers
  1. States within 500 miles of early-legalization states (CA/NY/DC, Myers (2017))
  2. States with early abortion reforms
SPILLOVERS, NON-WHITE RESULTS

Diagram showing trends in non-white maternal and abortion mortality.
Any Abortion Reform, Non-White Results

Non-white Maternal Mortality

- TWFE-Controls, N=1,122, 95% CI
- IW-Controls, N=714, 95% CI

Broad Non-white Abortion Mortality

- TWFE-Controls, N=1,122, 95% CI
- IW-Controls, N=714, 95% CI

Narrow Non-white Abortion Mortality

- TWFE-Controls, N=1,122, 95% CI
- IW-Controls, N=714, 95% CI
De facto, WHITE AND NON-WHITE RESULTS
PLACEBO TEST AND MISSPECIFICATION TEST

![Graphs showing mortality trends](image)

**White All-Cause Male Mortality 15-44**
- TWFE-Controls: N=1,122, 95% CI
- IW-Controls: N=765, 95% CI

**Non-white All-Cause Male Mortality 15-44**
- TWFE-Controls: N=1,122, 95% CI
- IW-Controls: N=765, 95% CI

**White All-Cause Female Mortality 15-44**
- TWFE-Controls: N=1,122, 95% CI
- IW-Controls: N=765, 95% CI

**Non-white All-Cause Female Mortality 15-44**
- TWFE-Controls: N=1,122, 95% CI
- IW-Controls: N=765, 95% CI
Roe v. Wade Relative to Early-Legal States (by 1970, TWFE)

White Maternal Mortality

Broad White Abortion Mortality

Narrow White Abortion Mortality

Non-white Maternal Mortality

Broad Non-white Abortion Mortality

Narrow Non-white Abortion Mortality
Abortion Demand–Abortion Deaths Prior to Legalization (1965)

Panel A: Maternal Mortality

Panel C: Narrow Abortion Mortality
## Robustness Checks: Year-over-Year Changes in Mortality

### Panel A: 1972-1973

<table>
<thead>
<tr>
<th></th>
<th>Maternal Mortality</th>
<th></th>
<th>Broad Abortion Mortality</th>
<th></th>
<th>Narrow Abortion Mortality</th>
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<td>(3) Non-White</td>
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<td>(5) Non-White</td>
<td>(6)</td>
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<tr>
<td>Roe v. Wade</td>
<td>-0.5622 (0.7312)</td>
<td>-0.8322 (0.8897)</td>
<td>1.2008 (1.5364)</td>
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### Panel B: 1973-1974

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<th>Maternal Mortality</th>
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<th>Broad Abortion Mortality</th>
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<td>(6)</td>
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<tr>
<td>Roe v. Wade</td>
<td>-0.3809 (0.7345)</td>
<td>-0.2824 (1.0890)</td>
<td>-0.7232 (1.6853)</td>
<td>-0.3107 (0.4942)</td>
<td>0.1300 (0.4393)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Source: NVSS/CDC Multiple Cause of Death Files, 1959-1980.

The model is given by:

\[
\text{Mortality}_{st} = \alpha + \beta \text{Roe v. Wade}_{st} + \mathbf{X}'_{st} \gamma + a_s + \epsilon_{st}
\]
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<th>Weight</th>
<th>DD Estimate</th>
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<td>Earlier Treated v. Later Control</td>
<td>0.628</td>
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<td>Later Treated v. Earlier Control</td>
<td>0.372</td>
<td>-0.148</td>
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<td>Average DD Estimate</td>
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<td>White Maternal Mortality</td>
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<td>Narrow Abortion Mortality</td>
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Notes: controls and weights excluded