1 Teen Motherhood and Abortion Access: Context

Question of the Kane and Staiger paper: What is the impact of limiting access to abortion on the frequency (rate) of teen motherhood?

- This question may seem too obvious to ask. There are only three possible answers (more births, fewer births, or no change) – and most people are quite sure they know which is correct. That’s partly what makes it a good paper.

- Why is this an interesting question:
  1. Up until 1992, teen birthrates were rising, especially out of wedlock. (See K-S, Figure I)
  2. Simultaneously, there had been substantial reductions in abortion access (decline in providers, increase in legal and social impediments) since passage of Roe v. Wade in 1973. (See K-S, Figure III)

- Hence, a great testable hypothesis: Reductions in abortion availability explain rise in teen birth rates.

- (Note: To many the question is already answered just by looking at the figures. Students in 14.03 would not be so naive.)

- How do we evaluate the causal question?

  1. Cross-sectional:
     - Correlate teen birth rates with abortion access by city/state/county.
     - How do you interpret this?
       * Places that don’t have access have low birth rates. This could just reflect ‘strict attitudes’ that limit teen behavior and the availability of clinics.
* Places that don’t have access have **high** birth rates. Could be causal. But could reflect the local social norms, e.g., Mormons choose to have high fertility and do not condone abortion.

2. Changes over time:
   - Observe *changes* in teen births when abortion providers come and go.
   - This implicitly removes the part of variation due to stable attitudes or norms that affect birth rates and are constant.
   - Can think of this as a simple diff-in-diff model: comparing changes in birth rates in counties that had a reduction in abortion access to counties that did not.
   - Of course, if norms and access move together, does not solve the causality problem.
   - Hence, look for sharp changes in access and see if they result in changes in births.

1.1 **Seems straightforward –** so why write a model?

- Why use a model?
  - Clarifies thinking, removes cobwebs from brain.
  - Makes clear the implicit assumptions that we bring to the analysis.
  - Most people already have a model in place, they just don’t know it. [The unexamined model is not worth having.]

- What is the basic editorial page assumption about the impact of abortion availability on birth rates? Most likely: restrictions on abortion increase birth rates.

- What is the key assumption built into this model?
  - Pregnancy is “exogenous,” i.e., predetermined or immutable.
  - Or at a minimum, people don’t take into account availability of abortion when making decisions about sexual activity or contraception.

- Is this plausible? What factors might influence the probability that someone chooses to get pregnant?
  - Ability to care for the child.
  - Likelihood of the relationship with the partner continuing.
  - Marital status.
– Possibility of aborting pregnancy if turns out to be ‘unwanted’ (what economists call: Option Value).

• Consider:

\[
\text{Teen Birth Rate} = \frac{\text{births}}{\text{teens}} = \frac{\text{pregnancies} \cdot \Pr(\text{birth} | \text{pregnant})}{\text{teens}}.
\]

• Abortion unambiguously affects probability of birth conditional on pregnancy

\[
\frac{\partial \Pr(\text{birth} | \text{pregnant})}{\partial (\text{abortion-access})} < 0.
\]

• What about pregnancies? If abortion availability affects the number of pregnancies, it must be by increasing the number of pregnancies. Availability of abortion makes pregnancy potentially more attractive.

\[
\frac{\partial (\text{pregnancies})}{\partial (\text{abortion-access})} \geq 0.
\]

• Whether abortion actually raises pregnancy is a testable empirical question.

• Of course, an increase in pregnancy does not necessarily imply an increase in births. If abortion access raises pregnancies and raises abortions, net effect on births is ambiguous.

• But this tiny baby step towards formalization points out that the impact of abortion on births is ambiguous.

2 Stylized model

• Kane-Staiger offer a stylized model of sequential decision making under uncertainty.

• By stylized, we mean that it captures important salient features of the problem in a schematic form.

• It obviously leaves out thousands of other considerations. Important questoin is whether or not it captures (excludes) the right ones.

• The uncertainty faced by a woman in this model is whether a pregnancy will result in an in-wedlock or out-of-wedlock birth.

• The key operative assumption is that all else equal, an in-wedlock pregnancy gives higher utility.

• Is this likely to be true? Not in all cases, but probably on average.
• Parameters:

\[
\begin{align*}
0 &= \text{Utility of not becoming pregnant (normalization)} \\
1 &= \text{Utility of in-wedlock birth (normalization)} \\
P &= \Pr(\text{In wedlock birth}|\text{pregnant}) \\
B &= \text{Disutility (psychic + monetary cost) of out-of-wedlock birth} \\
A &= \text{Disutility (psychic + monetary cost) of abortion}
\end{align*}
\]

• The sequence of choices is (see Fig 1):

Kane-Staiger

1. Choose whether to become pregnant or not
2. If pregnant, learn about whether will be in wedlock. As above, probability is \( P \) that will decide to marry.
3. If will marry, have baby.
4. If not married, choose ‘least bad’ alternative: a) have out-of-wedlock birth; b) have abortion.

• Do the assumptions in this model seem to describe the considerations faced by many potential mothers?

• We want to consider how a rise in \( A \) affects pregnancies, abortions and births in this model.

• We are studying the affect of an increase in \( A \) since this is the parameter that captures the variation analyzed by this study.
• Holding all other monetary and psychic costs constant, an increase in the distance to an abortion provider (perhaps because the provider closes in your county), raises the disutility of abortion $A$. An increase in distance makes $A$ larger ($-A$ more negative).

2.1 How does a rise in $A$ affect pregnancies, abortions, births?

• You want to solve this problem by backward induction. Start with the possible outcomes \{0, 1, $-\min[A, B]$\}, and work your way backwards up the tree to find the woman’s best choice.

• Write the expected utility of a women facing this decision framework where $No, Yes$ represent decisions to become pregnant:

\[
E(U|No) = 0 \\
E(U|Yes) = P \cdot 1 - (1 - P) \min(A, B)
\]

• Notice that the disutility of the non-marital outcome (which occurs with probability $1 - P$) is the minimum of the disutility of abortion or out-of-wedlock birth. In other words, women will always choose the least bad (most preferred) option.

• In this model, women choose to become pregnant iff:

\[
P - (1 - P) \cdot \min(A, B) > 0 \\
\frac{P}{1 - P} > \min(A, B)
\]

• Bear in mind that each woman has her own $B, A$ and $P$. That is, she knows her own psychic cost of abortion and has her own assessment of $P$, the probability of an in-wedlock birth conditional on pregnancy. The policy variable here is $A$, the psychic cost of abortion. By reducing access to abortion providers, policy can potentially raise $A$ (somewhat) from whatever level a woman initially perceives it to be.

• See figure below. This represents a woman’s decision options in $A - P$ space, i.e., as a function of the probability of in-wedlock birth conditional on pregnancy and the psychic/monetary cost of abortion.

• A reference level of $B$ is also chosen, representing the psychic cost of out-of-wedlock birth. It is critical to include $B$ in this figure since the cost of $A$ only matters if it less than $B$ (otherwise the cost of $B$ becomes relevant).
• Since both \( B \) and \( A \) will vary across women, this figure represents the choice for women with a given level of \( B \) but with varying values of \( P, A \).

• An individual woman in this figure can be depicted by a point \( \{A, P\} \), where \( A \) and \( P \) are her personal disutility of abortion and expected probability of in-wedlock marriage conditional on pregnancy. We are fixing \( B \) at some initial level since the graph does not have 3 dimensions. Since all that matter in this figure is the difference between \( B \) and \( A \), you can just as well think of \( A \) as \( A^0 = A - B \).

• There are three regions in this figure representing different decisions for given \( A, B, P \).

• There are three possible sets of preferences depicted in this figure that depend on individuals’ parameter values:

![Diagram with regions labeled]

<table>
<thead>
<tr>
<th>Region 3: ( A &lt; B ), ( p &gt; A/(1+A) )</th>
<th>12#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will get pregnant</td>
<td>Region 2: ( A &gt; B ), ( p &gt; B/(1+B) )</td>
</tr>
<tr>
<td>( p(\text{abort}) = 1-p )</td>
<td>Will get pregnant. Will not abort</td>
</tr>
<tr>
<td>( P(\text{out-of-wedlock birth}) = 0 )</td>
<td>( P(\text{out-of-wedlock birth}) = 1-p )</td>
</tr>
</tbody>
</table>

At \( z: A = B \)

Region 1: not worth risk of pregnancy:
- \( p \) too low

2.2 Region 1. Not planning to become pregnant:
\[
P < \frac{\min(A, B)}{1 + \min(A, B)}
\]

• A woman described by this equation chooses not to become pregnant b/c the probability of an in-wedlock birth is too low to make pregnancy attractive.

• [Remember that, by assumption, all women prefer no birth to an out of wedlock birth prior to pregnancy.]

What happens if \( A \) increases to \( A' > A \) in Region 1?
• For women in Region 1, the probability of an in-wedlock birth is too low to make pregnancy attractive. A rise in $A$ to $A'$ has no effect on behavior or well being. Impacts:
  
  - Pregnancies: null
  - Abortions: null
  - Births: null
  - Out-of-wedlock births: null

2.3 Region 2. Planning to get pregnant, will not abort.

\[
A > B \\
P > \frac{B}{1+B}
\]

• The first equation says that these women find an out of wedlock birth preferable to an abortion.

• The second equation says that these women view the odds of an in-wedlock birth as sufficiently favorable to become pregnant.

• They will get pregnant and will not abort if the child if the marriage does not materialize.

\[
P(\text{Abort}) = 0 \\
P(\text{No-Wedlock}) = 1 - P
\]

**What happens if $A$ increases to $A' > A$ in Region 2?**

\[
A' > A > B \\
P > \frac{B}{1+B}
\]

• For this woman, a rise in $A$ to $A'$ also has no effect on behavior because abortion was never an attractive option. Impacts:
  
  - Pregnancies: null
  - Abortions: null
  - Births: null
  - Out-of-wedlock births: null
2.4 Region 3. Planning to get pregnant, will abort if out of wedlock

\[
\begin{align*}
    P & > \frac{\min(A,B)}{1+\min(A,B)} \\ 
    A & < B
\end{align*}
\]

- The first equation says that the odds of in-wedlock birth are sufficiently high that the agent will choose to become pregnant.
- The second equation says that, at the initial value of \( A \), the agent will abort if the marriage is revealed to be out of wedlock.

\[
\begin{align*}
    P(\text{Abort}) & = 1 - P \\ 
    P(\text{No-Wedlock}) & = 0
\end{align*}
\]

- This situation is depicted as Region 3, which extends vertically from above the curved line, \( A/(1+A) \) and extends horizontally to the point \( B \).
- Region 3 can be further subdivided into two sub-regions: women whose value of \( P \) is above or below \( z \).

\[
z \equiv \text{value of } P \text{ where } \frac{A}{1+A} = \frac{B}{1+B} \Rightarrow A = B.
\]

1. (a) Women in Region 3a, with \( P < z \), would abort if the child is out of wedlock. But would not become pregnant if abortion were too psychically costly since \( P < \frac{B}{1+B} \).
(b) Women in Region 3b, with \( P \geq z \), would abort if out of wedlock. But notice that if abortion were too psychically costly, they would have an out-of-wedlock birth because \( P > \frac{B}{1+B} \).

What happens if \( A \) increases to \( A' > A \) in Region 3?

2.4.1 Region 3b: \( P \geq z \)

- Women in Region 3b are planning to get pregnant and abort out if out of wedlock.
- But they would choose to have an out-of-wedlock birth rather than abort if \( A' > B \).
• For these women, pregnancy is **exogenous**. The cost of abortion does not affect pregnancy *decision* because these women are willing to bear out-of-wedlock children rather than not get pregnant.

• An increase in $A$ moves them from Region 3b to Region 2 in the figure.

• Impact of rise in $A$:

  - Pregnancies: null
  - Abortions: −
  - Births: +
  - Births to married mothers: null
  - Births to unmarried mothers: +

• This appears to be the group that the standard newspaper account has in mind: will get pregnant regardless and would use abortion if available. Raising cost of abortion increases births to unwed mothers.

• Note that these births are in some sense “unwanted” in that women would have rather aborted before ‘price’ of abortion rose.

**2.4.2 Region 3A: $P < z$.**

\[
\begin{align*}
A & < A' < B \\
P & > \frac{A}{1 + A} \\
P & < \frac{A'}{1 + A'} \\
P & < z
\end{align*}
\]

• As in Region 3b, women in Region 3a are planning to get pregnant and abort out if out of wedlock.

• Given the rise in $A$ to $A'$, these women will now choose *not to get pregnant* because the cost of abortion in the case of out-of-wedlock is now too great to bear the risk (this follows from $P < z$).

• For these women, the pregnancy decision is **endogenous** to the availability of abortion. They desire in-wedlock births and abortion provides “insurance” to make this feasible.

• When the cost of insurance rises from $(1 - P) \cdot A$ to $(1 - P) \cdot A'$, these women choose not to become pregnant.
• They are moved from Region 3a to Region 1 of the figure.

• Impact of rise in A:
  
  – Pregnancies: –
  – Abortions: –
  – Births: –
  – Births to married mothers: –
  – Births to unmarried mothers: null

• Abortions fall but births fall by more than abortions. The reason is that for every 1 pregnancy averted, only 1 \( P \) abortions is averted.

• Further, all of these averted children would have been in-wedlock: out-of-wedlock births rise as a share of all births.

• [For some women, \( A' > A \) but \( P > \frac{A'}{1 + A'} \). Behavior will not change but abortion will become more psychically costly.]

2.5 Summarizing empirical predictions:

• Small rises in A that yield \( A < A' < B \) will reduce pregnancies, abortions, and births by inducing women to choose not to get pregnant.
  
  – In this case, the birth rate falls more than the abortion rate and the births averted would have been in-wedlock.
  – A decline in abortion access actually reduces births.

• Large increases in A that yield \( A < B < A' \), will affect two groups of women, those as above who would only get pregnant if abortion provided “insurance” and those who would choose to bear an out-of-wedlock child if abortion became too expensive.
  
  – Here, pregnancies and abortions will fall.
  – Total impact on births is ambiguous (depending on the size of the two groups).
  – Out of wedlock births can rise or fall (depending on the size of the two groups).
3 Results

• Table III:
  - Distinction between cross-section and within-county over-time variation (akin to differences-in-differences).
  - Which source of variation do you find more credible?

• Table V:
  - Impact of abortion restrictions on out-of-wedlock births is positive but insignificant. (This contrasts with standard newspaper expectations).
  - Impact of abortion restrictions on in-wedlock births is negative, significant, and economically large. These are akin to the women moved from Region 3 to 1.

• Figure VI:
  - Closest thing to a ‘natural experiment.’ Single, large decreases of 50 miles or more in the distance to nearest abortion provider.

4 Welfare analysis: What is the affect of rise in $A$ to $A'$ on women’s utility?

1. Women always in Region 1. Never planned to get pregnant. No effect on well-being $\Rightarrow$ Indifferent

2. Women in Region 2, i.e., those who never intended to abort under any circumstances

   $$ B < A < A' : P - (1 - P)B = P - (1 - P)B \Rightarrow \text{Indifferent} $$

3a Women who go from Region 3 $\rightarrow$ 1 (choose not to conceive):

   $$ P - (1 - P)A > 0 \Rightarrow \text{Worse off} $$

3b Women who go from Region 3 $\rightarrow$ 2 (choose to conceive out of wedlock rather than abort):

   $$ P - (1 - P)A > P - (1 - P)B \Rightarrow \text{Worse off} $$

4. Women who remain in Region 3 despite rise in cost of abortion (continue to conceive, abort if out-of-wedlock):

   $$ P - (1 - P)A > P - (1 - P)A' \Rightarrow \text{Worse off} $$
• Hence, 3 out of 5 groups of women are worse off. (Men are also presumably worse off.)

• Women are worse off for three reasons:

  1. Not having children b/c didn’t want to risk pregnancy without abortion option.
  2. Forced to bear out-of-wedlock children in cases where would have chosen not to get pregnant if had known that would have been out-of-wedlock.
  3. Raising psychic and monetary costs of abortion for women who continue to have them.

• So, do not confuse impacts on births with implications for women’s well-being. Restricting access to abortion harms women, even if it results in fewer births (in this model).

• [Of course, it is a fundamental tenet of consumer theory (the Carte Blanche principle) that, under standard competitive conditions, restricting choice cannot make people better off.]

5 Conclusions

• Substantive:
  – Small reductions in abortion access may increase birth rates.
  – This comes at the price of definite harm to women.
  – Entire reduction is among in-wedlock births – presumably women who were only willing to get pregnant if they have the opportunity to abort should marriage plans go awry.
  – “Abortion as insurance.”

• Economic:
  – A simple, explicit economic model of choice can put you miles ahead of the implicit models used in popular conversation, media.
  – The key insight of the economic model: rational, forward-looking behavior by individuals means that people respond to changes in their choice set by changing behavior.