Lecture 12 - The Demand for Abortion: An Application of Expected Utility Theory

14.03 Spring 2003

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 in fact 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. This confuses correlation with causation.)

- 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.

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* 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.
   - 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 Why write a model?

- Start with a conceptual model of choice.

- Why do we need 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. And the unexamined model is not worth having!

- What is the basic editorial page assumption about the impact of abortion availability on birth rates? [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.

- Does this make sense?

- 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.'

- Consider:

$$\text{Teen Birth Rate } = \frac{\#births}{\#teens} = \frac{\#pregnant \cdot \Pr(born|pregnant)}{\#teens}.$$

- Q: What does abortion unambiguously affect?

$$\frac{\partial \Pr(born|pregnant)}{\partial(abortion\text{-}access)} < 0.$$

- Q: What about $\#pregnant$?

$$\frac{\partial \#pregnant}{\partial(abortion\text{-}access)} \geq 0.$$

- *If* abortion availability affects the number of pregnancies, it would be by increasing the number of them.

- Whether abortion availability does this is an empirical question.

- Even if so, would not necessarily offset reduction of conditional probability of birth (through abortion).

- But this tiny baby step towards formalization points out that the impact is ambiguous.

1.2   Stylized model

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

- By stylized, the notion is that it captures important salient features in a schematic form.

- It obviously leaves out thousands of other considerations.

- Worth discussing whether it captures and excludes the right ones.

- The uncertainty for 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 many.

- Parameters:

$$
\begin{aligned}
0 &= \text{Utility of not becoming pregnant} \\
1 &= \text{Utility of in-wedlock birth} \\
P &= \Pr\left(\text{In wedlock birth}|\text{pregnant}\right) \\
B &= \text{Disutility (psychic + monetary cost) of out-of-wedlock birth} \\
A &= \text{Disutility (psychic + monetary cost) of abortion}
\end{aligned}
$$

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

Kane-Staiger
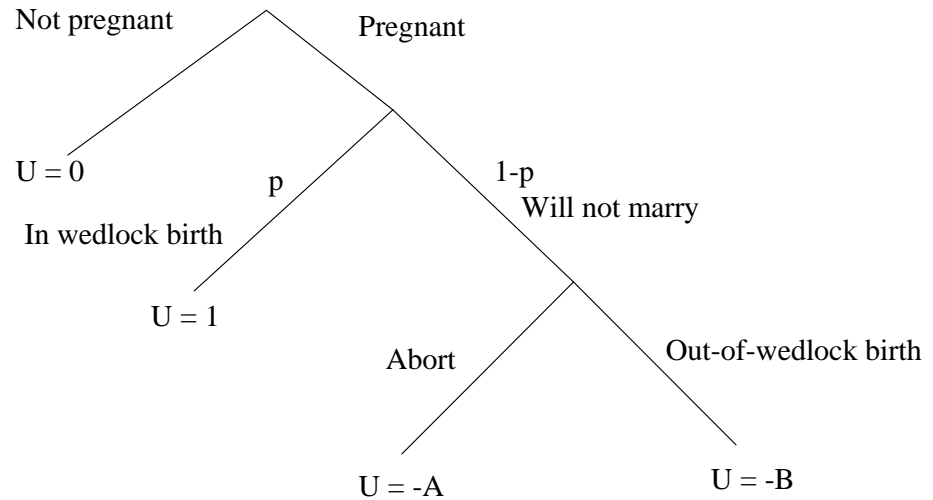
1. Choose whether to become pregnant or not

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? (Discuss)

- We next want to consider how a rise in A affects pregnancies, abortions and births.

- 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.

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

- Write the expected utility of a women facing this decision framework where NO, YES represent decisions to become pregnant:

$$
\begin{aligned}
E(U|NO) &= 0 \\
E(U|YES) &= P \cdot 1 - (1 - P)\min(A, B)
\end{aligned}
$$

- 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:

$$
\begin{aligned}
P - (1 - P)\min(A, B) &> 0 \\
\frac{P}{1 - P} &> \min(A, B) \\
\text{(or) } P &> \frac{\min(A, B)}{1 + \min(A, B)}
\end{aligned}
$$

- See Hand Drawing Figure 2. This figure 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.

- There are three regions in this figure representing different decisions for given A, B, P.

  1. Region 1. Not planning to become pregnant:

  $$
  P < \frac{\min(A, B)}{1 + \min(A, B)}.
  $$

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

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

  $$
  \begin{aligned}
  A &> B \\
  P &> \frac{B}{1 + B}
  \end{aligned}
  $$

Women with these preferences *will* get pregnant, will not abort if the child is out of wedlock since $A > B$. Hence:

$$
\begin{aligned}
P(Abort) &= 0 \\
P(OutofWedlock) &= 1 - P
\end{aligned}
$$

3. Region 3. Planning to get pregnant, will abort if out of wedlock since $A < B$.

$$
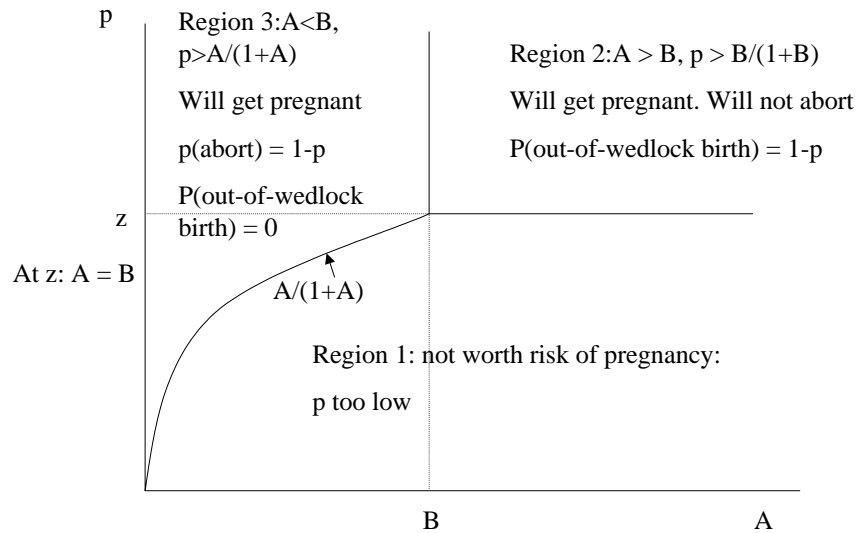\begin{aligned}
P(Abort) &= 1 - P \\
P(OutofWedlock) &= 0
\end{aligned}
$$

Notice that this region can be further subdivided into women whose value of P is above or below z, the point where $\frac{A}{1+A} = \frac{B}{1+B} \Rightarrow A = B$.

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

(a) For women in Region 1 with $P < z$, would abort if out of wedlock. But would not become pregnant if abortion were too psychically costly, because $P < \frac{B}{1=B}$.

(b) For women in Region 1 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 $P > \frac{B}{1=B}$.

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At z: A = B

Region 3:A<B, p>A/(1+A)

Will get pregnant

p(abort) = 1-p

P(out-of-wedlock birth) = 0

A/(1+A)

Region 2:A > B, p > B/(1+B)

Will get pregnant. Will not abort

P(out-of-wedlock birth) = 1-p

Region 1: not worth risk of pregnancy:

p too low

1.3.1 Now, consider a rise in A from A to A'.

1. Case 1: Not planning to get pregnant. See **Region 1** of Figure.

$$P < \frac{\min(A, B)}{1 + \min(A, B)}.$$

   - A woman described by this equation will choose not to become pregnant. The probability of an in-wedlock birth is too low to make pregnancy attractive.
   - For this woman, a rise in A to A' has no effect on behavior or well being. Since she was not going to become pregnant at the initial level of A.
   - Behavior unaffected.
   - Impact of rise in A:

       - Pregnancies: null
       - Abortions: null
       - Births: null
       - Out-of-wedlock births: null

2. Case 2: Planning to get pregnant, not planning to abort under any circumstances. See **Region 2** of Figure.

$$\begin{aligned} A' &> A > B \\ P &> \frac{B}{1+B} \end{aligned}$$

   - For this woman, a rise in A to A' has no effect on behavior because abortion was never an attractive option.
   - Behavior unaffected.
   - Impact of rise in A:

       - Pregnancies: null
       - Abortions: null
       - Births: null
       - Out-of-wedlock births: null

3a Case 3a: Planning to get pregnant, abort if out-of-wedlock. **Region 3** with $P < z$.

$$\begin{aligned} A &< A' < B \\ P &> \frac{A}{1+A} \\ P &< \frac{A'}{1+A'} \\ P &< z \end{aligned}$$

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- A woman described by these equations was initially planning to become pregnant and abort if out-of-wedlock.
- Given the rise in A to A', she will now choose *not to get pregnant* b/c 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 3 to Region 1 of figure.
- Impact of rise in A:
  - Pregnancies: $-$
  - Abortions: $-$
  - Births: $-$
  - Births to married mothers: $-$
  - Births to unmarried mothers: null
  - Notice that abortions fall, but *births fall by more than abortions.* The reason is that for every 1 pregnancy averted, only $1 - P$ abortions is averted.
  - The rise in the cost abortion moves the pregnancy margin by more than the abortion margin.
  - Further, all of these averted children would have been in-wedlock.
  - So out-of-wedlock births *as a share of all births* rise.
- Note, for some women will be the case that $A' > A$ but $P > \frac{A'}{1+A'}$, meaning that behavior will not change though abortion more psychically costly.

3b. Case 3b: Planning to get pregnant and abort out if out of wedlock. But would bear out of wedlock if $A' > B$. **Region 3** with $P > z$.

$$
\begin{aligned}
A &< B < A' \\
P &> \frac{A}{1+A} \\
P &> \frac{B}{1+B} \\
P &> z
\end{aligned}
$$

- 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 rather than not get pregnant.

- They are moved from Region 3 to Region 2 in 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.
- Note that these births are in some sense "unwanted" in that women would have rather aborted before 'price' of abortion rose.

- To summarize:
  - **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).

1.4 What is 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 $3 \to 1$ (choose not to conceive):

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

3b Women who go from Region 3 → 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.

- So, do not confuse impacts on births with implications for women's well-being. In this model, restricting access to abortion *harms women*, even if it results in fewer births. 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.

1.5 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.

1.6 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.