0.1 Abortion and the marginal child

- A pregnant woman aborts the pregnancy because the child is unwanted. If the child is born, it may be worse off relative to its siblings or other children. The other children in the family may benefit from an abortion because there is one less child to compete for resources.

- So legalized abortions may increase the proportion of wanted children relative to unwanted children. Thus children born in legalized abortion states may do better than those where abortions are illegal.

- The above argument is not tight. For example, consider the case where fathers were willing to marry their unwed pregnant partner without legalized abortions (shotgun marriages). But the fathers are no longer willing to marry their unwed pregnant partner with legalized abortions. That is, the fathers want their unwed pregnant partners to abort. If a significant number of unwed pregnant women have their children without partners, these children may be worse off then if there was no legalized abortion.

State i in year t which legalized abortion is a reform state r.

State i in year t' which did not legalize abortion is a non reform state n.

Let y_t^{is} be the average social economic outcome of children born in year t in state i where $s = \{r, n\}$. E.g. y may be probability that a child is living with a single parent, the probability that a child is living on welfare.

Let

$$y_t^{ir} = y_t + y^i + y^r \quad (1)$$

$$y_t^{in} = y_t + y^i + y^n \quad (2)$$

There is a year effect, y_t, which is common to all states in a particular year t, like a recession.

There is a state effect, y^i, which is common to state i for all years. E.g. New York state is a rich state.

Finally, there is an abortion effect, y^r versus y^n.

Consider state i where abortion was illegal until year $T-1$. Abortion was legalized at year T. You have observations on year $t = 1, .., T, .., \tau$. Then let the first difference estimator be:

$$\begin{aligned} \Delta \overline{y}^i &= \sum_{t \geq T} \frac{y_t^{ir}}{\tau - (T-1)} - \sum_{t<T} \frac{y_t^{in}}{T-1} && (3) \\ &= \overline{y}_{t \geq T} + y^i + y^r - (\overline{y}_{t<T} + y^i + y^n) && (4) \\ &= (\overline{y}_{t \geq T} - \overline{y}_{t<T}) + (y^r - y^n) && (5) \end{aligned}$$

Will $\Delta \overline{y}^i$ measure the change in the average welfare of children in state i due to legalizing abortion, $(y^r - y^n)$?

If $\overline{y}_{t \geq T}$ is not equal to $\overline{y}_{t<T}$, for example if there is a big recession in year T and after, then $\Delta \overline{y}^i$ will not measure the abortion effect.

Now consider another state j which always legalized abortion. Then:

$$
\begin{aligned}
\Delta\overline{y}^j &= \sum_{t \geq T} \frac{y_t^{jr}}{\tau - (T-1)} - \sum_{t<T} \frac{y_t^{jr}}{T-1} && (6) \\
&= \overline{y}_{t \geq T} + y^j + y^r - (\overline{y}_{t<T} + y^j + y^r) && (7) \\
&= \overline{y}_{t \geq T} - \overline{y}_{t<T} && (8)
\end{aligned}
$$

Consider the difference in differences estimator:

$$
\begin{aligned}
\Delta\Delta\overline{y} &= \Delta\overline{y}^i - \Delta\overline{y}^j && (9) \\
&= y^r - y^n && (10)
\end{aligned}
$$

When will this estimator not give you the right answer, $(y^r - y^n)$?

In Table 1, column 3, reform states reduced the percent living with single parents by about 4% compared with non reform states.

Column 12 shows that the reduction in low birth weight children is about 1.3%.

0.1.1 100 million women are missing

Estimate the number of "missing women" in a country by calculating the number of extra women who would have been there if the country had the same ratio of women to men as obtain in areas of the world in which they receive similar care. If we could expect equal populations of the two sexes, the low ratio of 0.94 women to men in South Asia, West Asia, and China would indicate a 6 percent deficit of women; but since, in countries where men and women receive similar care, the ratio is about 1.05, the real shortfall is about 11 percent. In China alone this amounts to 50 million "missing women," taking 1.05 as the benchmark ratio. When that number is added to those in South Asia, West Asia, and North Africa, a great many more than 100 million women are "missing." These numbers tell us, quietly, a terrible story of inequality and neglect leading to the excess mortality of women.

(Amartya Sen, *NYRB*, vol. 37(20), 1990)

0.2 Hepatitis B and missing women

There is substantial evidence that women who are carriers of hepatitis B give birth to a higher ratio of boys to girls than non-carriers. Since many of the countries with missing women also have relatively high hepatitis B carrier prevalence, the naturally occurring higher sex ratio at birth could produce a higher population sex ratio even in the absence of excess female mortality. After adjusting for differences in sex ratio at birth caused by hepatitis B, the number of missing women drops to 32 million, from the 60 million calculated by Coale(1991) and the 107 million suggested by Sen(1992). There is significant variation among countries in the share of missing women that can be explained: I find that hepatitis B can explain 75% of the missing women in China, but less than 20% in India, Pakistan and Nepal.

(Emily Oster, *Journal of Political Economy*, forthcoming)