

**A Comment on Donohue and Levitt's (2006) Reply to Foote and Goetz (2005)**

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April, 2006

We thank Steve Levitt, John Dohonue, Chris Foote, and Chris Goetz for providing data and Chris Foote, Larry Katz and Ted Joyce for useful comments.

Donohue and Levitt (2001) (DLI) consider the hypothesis that U.S. legalization of abortion in the early 1970s caused much of the decline in crime in the 1990s. Foote and Goetz (2006) (FG) show, however, that one key result in DLI contained a coding error; dummies for state-year interactions were inadvertently omitted from the regressions. FG demonstrate that correcting this error, along with estimating the regressions using arrest rates rather than arrest levels, suggests virtually no effect of legalized abortion on crime.<sup>1</sup>

Donohue and Levitt (2006) (DLII) acknowledge the coding error and agree that correcting the mistake and using arrest rates suggests no effect of legalized abortion on crime. DLII argue, however, that use of an improved abortion measure and an instrumental variable revives or even strengthens their original result.

DLII adjust the DLI abortion measure in three ways. First, they utilize abortion by state-of-residence rather than by state-of-occurrence. Second, they use a time-weighted average of abortion because births that might have occurred in a given year could have been aborted in three different calendar years.<sup>2</sup> Third, they use a weighted average of abortion in a given state and in all other states to account for migration. In addition, DLII instrument for their original abortion measure, based on data from the Alan Guttmacher Institute, using data from the Centers for Disease Control. DLII suggest that incorporating the three adjustments, with OLS or IV, implies a substantial negative effect of abortion on violent arrests but not on property arrests.

To understand how these adjustments affect the results, we consider them individually and in various combinations. We focus only on results that include the entire set of fixed effects: for each year, age, and state, for each state\*year interaction, for each state\*age interaction, and for each age\*year interaction. We address only specifications that use arrest rates. We report standard errors clustered by state-cohort, as in DLI and DLII, and clustered by state.

The results are in Table 1. The top half presents OLS results while the bottom half presents IV results. We discuss the OLS results first.

Column (1) replicates the relevant entries of Column (3) in Table 5 of DLII.<sup>3</sup> This specification includes the state-year dummies inadvertently omitted from Table VII of DLI. It also uses arrest rates rather than arrests levels and the same measure of abortion as in DLI.<sup>4</sup> The results show negative but insignificant effects of legalized abortion for both violent and property arrests. The coefficients imply that legalized abortion explains only 0.2% of the decline in violent arrests and only 0.3% of the decline in property arrests between 1991 and 1998.

Columns (2)-(4) then show the results of making each DLII adjustment individually. Column (2) uses abortion by residence rather than abortion by occurrence. The point estimate becomes more negative for violent arrests but is still modest in size and not statistically significant. The result for property arrests becomes (insignificantly) positive. Column (3) shows the result of using year-weighted abortion by occurrence. The results are even smaller than those in column (1) without year weighting, and everything is insignificant. Column (4) shows the effect of making the mobility

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<sup>1</sup> FG also address other issues related to interpretation of the DLI results. See also Joyce (2006).

<sup>2</sup> DLII assume a six-month lag between possible abortion and possible birth and a constant arrest rate per month. Then, for example, for 15 year olds in 1993, 75 percent were exposed to abortion in 1978, 12.5 percent in 1977, and 12.5 percent in 1979.

<sup>3</sup> We report coefficients to five digits after the decimal point; when rounded to three digits, our estimates match the relevant estimates in DLII.

<sup>4</sup> The sample period, however, is 1985-1998, as in DLII and FG. The DLI sample period was 1985-1996.

correction only. The violent arrest result is more negative but not statistically significant. The property arrest result is also negative but not close to statistical significance.

Thus, none of the three adjustments individually suggests a substantial or statistically significant effect of legalized abortion on arrests. We next address specifications that combine two or more of these adjustments.

Column (5) shows results that use abortion by state-of-residence combined with year-weighting. These are similar to results without year-weighting. The violent arrest result is slightly more negative but still not statistically significant. The property result is again the wrong sign although not significant.

Column (6) shows results that use abortion by state-of-residence combined with the mobility correction. This produces a noticeably more negative coefficient for violent arrests although one that is at best marginally significant. And the property arrest coefficient is still positive.

Column (7) then shows the DLII results that use abortion by state-of-residence, year-weighted and mobility-adjusted. These are identical to those in DLII. The violent arrest result is now fairly substantial in magnitude and at least in the ballpark of significance. The property arrest coefficient is still positive, however, although insignificant. Thus the combination of all three adjustments does suggest a negative effect of legalized abortion on violent arrests.

Column (8) shows, however, that this result occurs in an unconvincing way. In these last regressions we split the abortion variable into two components: the year-weighted, by residence component from column (5) multiplied by the fraction of the cohort born in-state, and a new, “out-of-state” component that equals the same year-weighted by residence average as in DLII’s measure but for out-of-state abortions only. The in-state and out-of-state abortion measures sum to the year-weighted, mobility adjusted abortion variable from column (7). The natural hypothesis is thus that the coefficient on these two terms should be the same. In fact, the coefficient on out-of-state abortions is effectively zero for violent arrests and positive although not significant for property arrests.

The bottom half of Table 1 presents IV results. The results in columns (1)-(5) are mildly more consistent with the DLII story than are the OLS results, but the coefficients are still never significant. The results in columns (6) and (7), both of which incorporate the mobility correction, are more negative than their OLS counterparts and imply meaningful-sized effects of legalized abortion on crime. None of the results is statistically significant, however, especially using standard errors clustered by state. And column (8) shows that in this case the out-of-state abortion measure enters much more strongly than the in-state measure for violent arrests and with the wrong sign for property arrests. In both cases the in-state abortion measure is not significant.

Our conclusion is that the kind of analysis considered in Table VII of DLII does not suggest a quantitatively important effect of legalized abortion on crime. The best case for such an effect is the IV results in columns (6) and (7); these imply that abortion legalization explain 24-25.9% of the 1991-1998 decline in violent crime and 7.1-8.1% of that in property crime. None of these coefficients is statistically significant at conventional levels, however, and the results in column (8) suggest they rely on an implausible mechanism relating abortion to crime.

## References

- Donohue, John J., III and Steven D. Levitt (2001), "The Impact of Legalized Abortion on Crime," *Quarterly Journal of Economics*, **CXVI**(2), 379-420.
- Donohue, John J., III and Steven D. Levitt (2006), "Measurement Error, Legalized Abortion, and the Decline in Crime: A Response to Foote and Goetz (2005)," NBER WP #11987.
- Foote, Christopher L. and Christopher F. Goetz (2005), "Testing Economic Hypotheses with State-Level Data: A Comment on Donohue and Levitt (2001)," Federal Reserve Bank of Boston Working Paper No. 05-15.
- Joyce, Ted (2006), "Further Tests of Abortion and Crime," manuscript, Baruch College.

Table 1: Separating out DLII's corrections and demonstrating the importance of the out-of-state mobility

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>OLS - Violent Crime</i>								
Abortion Measure	-0.00016 (0.0033) [0.0047]	-0.00658 (0.0050) [0.0080]	-0.00001 (0.0035) [0.0053]	Mobility- adjusted AGI by occurrence	Year weighted AGI by residence	Mobility- adjusted AGI by residence	Year- weighted, mobility- adjusted AGI by residence	FG in/out measure
Out-of-state abortion measure								
<i>OLS - Property Crime</i>								
Abortion Measure	-0.00037 (0.0022) [0.0036]	0.00178 (0.0029) [0.0044]	-0.00029 (0.0023) [0.0040]	Mobility- adjusted AGI by occurrence	Year weighted AGI by residence	Mobility- adjusted AGI by residence	Year- weighted, mobility- adjusted AGI by residence	FG in/out measure
Out-of-state abortion measure								
<i>IV - Violent Crime</i>								
Abortion Measure	-0.00832 (0.0049) [0.0064]	-0.00493 (0.0085) [0.0144]	-0.00235 (0.0049) [0.0082]	Mobility- adjusted AGI by occurrence	Year weighted AGI by residence	Mobility- adjusted AGI by residence	Year- weighted, mobility- adjusted AGI by residence	FG in/out measure
Out-of-state abortion measure								
<i>IV - Property crime</i>								
Abortion Measure	-0.00461 (0.0036) [0.0065]	-0.00447 (0.0063) [0.0124]	-0.00284 (0.0036) [0.0071]	Mobility- adjusted AGI by occurrence	Year weighted AGI by residence	Mobility- adjusted AGI by residence	Year- weighted, mobility- adjusted AGI by residence	FG in/out measure
Out-of-state abortion measure								

There are 6,724 observations in the violent crime regressions and 6,730 in the property crime regressions. All regressions include fixed effects for each state, for each state\*year interaction, for each state\*age interaction, and each age\*year interaction. Standard errors clustered by cohort/state in parentheses and by state in brackets.