

# The Unwanted: Underlying Mechanisms for Unfavorable Outcomes over the Life Cycle

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Extended Abstract  
September 21, 2008

## 1 Introduction and Motivation

Unwanted pregnancies are likely to lead to negative life cycle outcomes (education, labor market, crime) for the adults that grow out of those pregnancies. It is unclear how much of this effect is causal. If those who tend to have unwanted pregnancies also have below average unobserved parenting traits, then the effect of being unwanted on later outcomes will be confounded by such traits. Policy changes that enhance women's ability to avoid and prevent unwanted pregnancies can be used as exogenous sources of variation in prevalence of unwanted fertility to identify its impact on infant, child, teen and adult outcomes. Much of the renewed interest in the analysis of unwanted fertility stems from recent work that points out its potential implications for crime, an outcome that most societies care deeply about. Indeed, Donohue and Levitt (2001,2004,2006) and Pantano (2007) suggest that unwanted children might be at risk of higher crime propensity. They provide evidence that abortion legalization and early access to the birth control pill reduce future crime once impacted cohorts reach their criminal prime. While the validity of these controversial findings remains heavily debated, they single out unwanted fertility as a potentially important determinant of a cohort's crime rate.

When looking at such a long term outcome using aggregate data, teasing out the specific mechanisms becomes problematic. Selection effects (i.e. the improvement in a cohort's average quality) cannot be easily separated from cohort size effects (i.e. the better opportunities that arise from less competition for a given set of resources). The latter may reduce the criminal propensities of those who are born out of *wanted* pregnancies thus lowering the crime rate, even with no improvement in the cohort's average quality. In this paper, we first focus on early outcomes such as prenatal care and birth weight where it is more likely that we are identifying at least part of the selection mechanism. Understanding these mechanisms is important from a policy perspective. If what matters is mostly the induced cohort size effect, then any policy that achieves such cohort size declines would achieve the same results. On the other hand, if the key is mechanism is the improvement in the cohort's mean quality, that also can be achieved in alternative ways, which not necessarily involve truncating out the bad tail of the distribution.

We exploit data from birth certificates to test whether early access to the pill led to significant changes in a particular form of early investment: prenatal care. We do so by exploiting both changes in abortion legal status during the early 70s as well as a natural experiment in early access to the pill which was induced by unrelated policy changes during the '60s and '70s. By reducing unwanted fertility, we expect these policy changes to increase the fraction of pregnancies carried to term under adequate prenatal care. This would provide more convincing evidence

in support of a selection hypothesis, as it is difficult to imagine how cohort size effects could arise in this intrauterine context.<sup>1</sup> Second, we exploit pregnancy intention self-reported data from the PSID to estimate the impact of being unwanted on a variety of outcomes, including birth weight, completed education, crime and labor market success. Birth weight has been consistently shown to have important long term consequences.<sup>2</sup> Here, the exogenous variation in contraceptive possibilities and abortions legal status can be used to instrument for unwantedness status in models of birth weight and other life cycle outcomes. As Rosenzweig and Wolpin (1993) point out, one needs to be careful when using retrospective assessments of unwantedness. It is likely, but not obvious, that births retrospectively assessed as unwanted will receive less nurturing and lower economic investment. In this vein, it is important to control for parental fertility preferences when evaluating the impact of unwantedness. If these unobserved preferences are correlated with prevalence of unwanted fertility, identification of the causal effect of interest becomes problematic. Despite the suspicion and skepticism with which researchers in the social sciences treat retrospective assessments of pregnancy intention, a recent validation study by Joyce, Kaestner & Korenman (2002) suggests that these assessments do not produce misleading estimates of the number and consequences of unintended births.

## 2 Data

In this paper we exploit data spanning the period 1969-1985 from the Natality Files of National Vital Statistics System (NVSS). We also use state level data on the timing of abortion legalization. Similarly, we employ state level data on the timing of pill access liberalization for young unmarried women. In this regard, the classification adopted here follows Hock (2005) which differs slightly from that used in Goldin & Katz (2002) and Bailey (2006). Finally, in the second part of the paper, we exploit data from the Panel Study of Income Dynamics and the National Survey of Family Growth. In particular, we use unwanted fertility assessments, birth weight and other life cycle outcomes.

## 3 Empirical Strategy

We first use birth certificates from NVSS to estimate triple difference specifications that essentially compare states with early legal access to the pill against states granting such access in later years and also exploits the difference between married and single women.<sup>3</sup> We are interested in the impact of early access to the birth control pill on the probability of being provided with adequate prenatal care  $PC_{ist}$ . We model this probability among those in the pool of pregnancies initiated at  $t - 1$ , that eventually lead to live births in  $t$ . We use the following specification:

$$PC_{imst} = \beta_0 + \beta_1 Pill_{s,t-1} + \beta_2 Single_{i,t} + \beta_3 Pill_{s,t-1} \times Single_{i,t} + \beta_4 X_{mst} + \theta_s + \theta_t + \varepsilon_{imst} \quad (1)$$

where  $PC_{ist}$  is a measure of prenatal care adequacy for child  $i$  in state  $s$  and year  $t$  and  $X_{mst}$  includes demographic characteristics of  $i$ 's mother, available in the Natality files from NVSS.  $\theta_s$  and  $\theta_t$  denote state and time effects and  $Single_{i,t}$  indicates mother's marital status at time  $t$ . We estimate this model on a sample of mothers 18 and 19 years old giving birth in year  $t = 1969, \dots, 1985$

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<sup>1</sup>It is instructive to entertain the unrealistic scenario in which cohort-size effects in prenatal care might operate. For example, they would do so in the unlikely event that provision of prenatal care is rationed. In such a case, the reduction in the absolute number of pregnancies brought about by the contraceptive technology improvement implies a cohort-size effect that would ease the queues for prenatal care, thus confounding the selection effect.

<sup>2</sup>See for example, Black, Devereux & Salvanes (2007), Royer (2006), Johnson & Schoeni (2007)

<sup>3</sup>Note that contraceptive opportunities for married women do not change over the period. Therefore they constitute a potentially valid comparison group.

Using the PSID data we consider the following specification for outcome,  $Y_{imsc}$  of individual  $i$  in cohort  $c$ , born to mother  $m$ , in state of birth  $s$ , as a function of her wantedness status ( $\text{Unwanted}_{imsc}$ ) as retrospectively assessed by the mother

$$Y_{imsc} = \alpha_0 + \alpha_1 \text{Unwanted}_{imsc} + \alpha_2 X_{im} + \lambda_s + \lambda_c + \varepsilon_{imsc} \quad (2)$$

where  $X_{im}$  include exogenous maternal characteristics available in the PSID. Unwantedness is likely to affect birth weight because women who "want" their pregnancies behave differently during the pregnancy<sup>4</sup> and even if they behave the same, there are a variety of unmeasurable health related factors that are associated with both wantedness and birth weight. So even if the retrospective assessment is a valid measure of pregnancy intention, it is still endogenous in (2) because it is likely to be correlated with unobservable factors that also determine birth weight. While is often hard to come up with valid instruments for unwantedness, we rely on the quasi-experimental variation provided by the staggered timing of pill access liberalization for young unmarried women across different states. This policy variation spans the period from 1960 to 1977.<sup>5</sup> We then consider the following first stage equation

$$\text{Unwanted}_{isc} = \gamma_0 + \gamma_1 \text{Pill}_{s,c-1} + \gamma_2 X_{ist} + \lambda_s + \lambda_c + \varepsilon_{ist} \quad (3)$$

The system given by (3) and (2) can be used to examine the impact of unwanted fertility on later outcomes  $Y_{imsc}$  such as completed education, labor force participation and earnings by exploiting to a greater extent the longitudinal features of the PSID. However, once we turn to these outcomes that occur later in life, the exclusion of the pill access indicator from the main equation (2) is less compelling because pill access will have an impact on those outcomes not only through its effect on wantedness but also through a cohort-size effect at the state-cohort level that, among other things, may improve student/teacher ratios and labor market opportunities, thus having an independent impact on education and labor market outcomes. Still this could be ameliorated by controlling for state level cohort sizes in the main outcome equation.

## 4 Preliminary Results

When using NVSS data to estimate equation (1) the key interaction coefficient  $\beta_3$  in equation (1) is significant and with consistent sign across specifications. Column 1 show the effect on the month of initiation of prenatal care, whereas columns 2, 3 and 4 show the effect of early pill access on the probability of prenatal care being initiated before 3, 4, or 5 months into the pregnancy.<sup>6</sup> Moreover, placebo tests confirm that the pill indicator has indeed no effect on prenatal care adequacy among births by older mothers. This is what we expect since these older mothers face no improvement in the set of contraceptive alternatives.

Using NSFG and PSID data we find that abortion legalization and early access to the pill leads to a decline in the probability of being designated as unwanted in a sample of live births. However, we do find that abortion legalization leads to an increase in sexual behavior in a sample of old women who already reached their ideal family size and therefore to an increase in the number of unwanted pregnancies. While these two findings are consistent with standard arguments, previous evidence was indirect using adoption data to infer the impact of abortion legalization on the number of unwanted births and sexually transmitted diseases to look at its impact on sexual behavior.

<sup>4</sup>In particular, they are more likely to seek early prenatal care and less likely to engage in risky behaviors such smoking and drinking. See Weller, Eberstein & Bailey (1987) and Marsiglio & Mott (1988)

<sup>5</sup>Following the pioneering work of Goldin and Katz (2000,2002) this policy induced natural experiment has been exploited by Hock (2005), Guldi (2005), Bailey (2006), Ananat and Hungerman (2007) and Pantano (2007)

<sup>6</sup>Note that however that the triple difference specification uses married women as a comparison group. But, following Goldin & katz (2002) note also that age at first marriage was itself affected by accessibility to the birth control pill so the composition of the groups might be changing before and after the policy change contaminating causal inference.

Finally, when estimating the equations given in (2) – (3) we find that being unwanted is causally associated with a variety of unfavorable outcomes over the life cycle, including lower education, more crime, higher risk of teen pregnancy and poor labor market performance.

## References

- [1] Ananat, Elizabeth & Hungerman, Dan (2006), "The Power of The Pill for the Next Generation" Working Paper
- [2] Bailey, Martha (2006) "More Power to the Pill: The Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply", *Quarterly Journal of Economics*
- [3] Black, Sandy , Devereux, Paul and Salvanes, Kjell (2007) "From the Cradle to the Labor Market? The Effect of Birth Weight on Labor Market Outcomes", *Quarterly Journal of Economics*
- [4] Donohue, John & Levitt, Steve (2001) "The Impact of Legalized Abortion on Crime", *Quarterly Journal of Economics*
- [5] Donohue, John & Levitt, Steve (2004) "Further Evidence that Legalized Abortion Lowered Crime: A Reply to Joyce", *Journal of Human Resources*
- [6] Donohue, John & Levitt, Steve (2006) "Measurement Error, Legalized Abortion, the Decline in Crime: A Response to Foote and Goetz (2005)"
- [7] Goldin, Claudia & Katz, Larry (2000) "Career and Marriage in the Age of the Pill", *American Economic Review*
- [8] Goldin, Claudia & Katz, Larry (2002) "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions", *Journal of Political Economy*
- [9] Guldi (2005) "Abortion or The Pill - Which Matters More? The Impact of Access on the Birth Rates of Young Women", mimeo.
- [10] Hock, Heinrich (2005) "The Pill and the College Attainment of American Women and Men," mimeo, Florida State University.
- [11] Johnson, Rucker C. and Schoeni, Robert F. (2007) "The Influence of Early-Life Events on Human Capital, Health Status and Labor Market Outcomes Over the Life Course, Working Paper
- [12] Joyce, Ted, Kaestner, Robert & Korenman Sanders (2002) "On the Validity of Retrospective Assessments of Pregnancy Intention" *Demography*
- [13] Marsiglio, Bill and Mott, Frank (1988) "Does Wanting to Become Pregnant with a First Child Affect Subsequent Maternal Behaviors and Infant Birth Weight?" *Journal of Marriage and the Family*
- [14] Pantano, Juan (2007) "Unwanted Fertility, Contraceptive Technology and Crime: Exploiting a Natural Experiment in Access to the Pill" Working Paper, UCLA
- [15] Rosenzweig, Mark and Wolpin, Ken (1993) "Maternal Expectations and Ex-Post Rationalizations: The Usefulness of Survey Information on Wantedness of Children, *Journal of Human Resources*
- [16] Royer, Heather (2006) "Separated at Girth: Estimating the Long-Run and Intergenerational Effects of Birth Weight using Twins" Working Paper

- [17] Weller, Eberstein and Bailey (1987) "Pregnancy Wantedness and Maternal Behaviors during Pregnancy" Demography.