Contraceptives, Unwanted Fertility, and Crime: A Study Across the USA

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ABSTRACT

This paper investigates the impact of coitus-independent contraceptive usage on crime rates in the United States. It explores the premise that the availability of more effective contraception, like the birth control pill, might have a profound societal impact similar to the observed decrease in crime rates following the legalization of abortion in the 1970s. The paper examines the correlation between the rise in the use of coitus-independent contraceptives and the decline in homicide rates, focusing on the period from 1955 to 1976 for contraception data and 1980 to 2003 for crime data. The research employs a fixed-effects model to analyze state-level data on contraception usage and homicide rates. The findings suggest a significant relationship between increased access to coitus-independent contraceptives and a subsequent decrease in homicide rates thirty years later. The paper discusses the implications of these findings for policymakers, emphasizing the potential of contraceptive access in reducing unwanted fertility and, consequently, long-term crime rates.

Introduction

The 2022 U.S. Supreme Court Case *Dobbs v. Jackson Women's Health Organization* rolled back abortion rights previously guaranteed in *Roe. v. Wade* in 1973 and has led to a cascade of laws making abortion almost, if not totally, illegal in several US states. Furthermore, Justice Clarence Thomas went even further in his concurrence to argue that the Court should go further in future cases, reconsidering other Supreme Court cases that granted rights based on substantive due process, such as *Griswold v. Connecticut*, which established the right to contraception (*Dobbs v. Jackson Women's Health Organization*, 2022). Encouraged by this statement, some groups are already aiming to restrict contraception as well by arguing that some contraceptive techniques such as intrauterine devices and emergency contraception cause "early abortions" (Stolberg, 2023). Besides the immediate consequences for women's health and autonomy, these actions may have wider societal implications.

Donohue & Levitt (2001) proposed that legalization of abortion in the 1970s contributed significantly to the fall in crime in the 1990s by reducing the number of "unwanted" children, who are known to be at elevated risk for less favorable life outcomes, by giving mothers more options to delay unwanted children until they are better prepared for the responsibilities of child-rearing. While their hypothesis has been called into question by a number of other researchers, the general reasoning around reducing unwanted children is sound. If abortion legalization did produce these effects, it stands to reason that access to better contraception should have produced similar, if not greater, effects on reducing crime via the same mechanism.

Goldin & Katz (2002) demonstrated that access to the birth control pill resulted in substantial increases in women's education and marriage age in the US population. Bailey (2013) went further, finding evidence that individuals' access to contraceptives "increased their children's college completion, labor force participation, wages, and family incomes decades later". Based on these previous studies, I will investigate the effect that the roll-out of better, coitus-independent contraception had on crime.

I was inspired to investigate this topic after hearing about Donohue & Levitt's research in their podcast, Freakonomics, and after coming across Claudia Goldin's research into contraception and women's advancement in the workforce. As a woman and activist in Virginia, a state experiencing significant debates over the legislation around abortion and contraception, these issues directly affect me and my future. I hope my research will better inform policymakers and the public at large of the possible societal consequences of such measures.

Background

Contraception

On May 11, 1960, the Food and Drug Administration (FDA) approved the use of norethynodrel, a synthetic progesterone, as an oral contraceptive for women (Asbell, 1995). Christened 'Enovid' by its manufacturer G.D. Searle, it and its successors (collectively referred to as 'the Pill') were met with extraordinary immediate adoption, heralding a new age in which women had "far greater certainty regarding the pregnancy consequences of sex" (Goldin & Katz, 2002, p. 731). By 1965, 41% of married women younger than 30 years using contraception were "on the Pill".

The invention of synthetic hormones for contraception also ushered in a new wave of coitus-independent contraceptive technologies (Knowles, 2012). Hormonal and copper IUDs became available to US women in the 1970s. Advancements in hormonal contraceptives saw the introduction of new birth control pill formulations alongside new methods such as Depo-Provera, Norplant, and the emergency contraceptive pill. The sexual and women's revolution of the 1960s and 70s ushered in by the Pill also increased the awareness and use of vasectomies and female sterilization.

These new methods supplanted older, less effective coitus-dependent methods. Failure rates for coitus-dependent methods such as the condom, diaphragm, and spermicide ranged from 10 to 30 percent per year (Institute of Medicine (US) Committee on Unintended Pregnancy, 1995). In comparison, these new coitus-independent methods had failure rates of only 1 to 8 percent per year (Asbell, 1995).

However, various legal obstacles initially prevented many women from using these new methods. State obscenity statutes, termed Comstock laws, often prohibited physicians from prescribing and pharmacists from selling the birth control pill (Bailey, 2013). Coitus-dependent methods such as the condom could be easily acquired through black market channels. In comparison, the Pill was available only from physicians and pharmacists, who usually complied with state laws. In addition, they needed to be taken every day and required periodic refills, making it even more difficult to acquire a usable supply illicitly.

Popular support for and widespread use of contraceptives pressured the U.S. Supreme Court to strike down bans on the use of contraceptives in the 1965 decision *Griswold v. Connecticut*, inducing state legislatures to revise their obscenity statutes such that by 1970, every state permitted the sale of contraceptives to married individuals (Bailey, 2013). Unmarried adults did not have access to contraception in every state until the 1972 *Eisenstadt v. Baird* decision, which extended the right to contraception regardless of marital status.

The gradual removal of these legal obstacles meant that the usage of coitus-independent contraception rose at different times in each state. I will use this quasi-experimental variation induced by the differential timing of contraceptive liberalization in different states to test for the effect of coitus-independent contraception on crime across the US.

Crime

From 1960 to 1990, crime in the United States increased steadily, with prominent criminologists predicting a crime explosion in the 1990s (DiIulio, 1996). Instead, between 1991 and 2000, property crime dropped 30

percent, violent crime fell 33 percent, and murder decreased by 44 percent, with numbers remaining this low until the present day (Federal Bureau of Investigation, 2010).

Many articles have been written focusing on how proximate causes such as the number of police, improved policing strategies, increased incarceration, or declines in the crack cocaine trade may have caused this reduction in crime rate (Donohue & Levitt, 2001). However, none of these factors can provide a satisfactory explanation for the country-wide drop in crime in the 1990s. Crime dropped even in cities that did not increase police and incarceration. Many areas that never had a sizable crack cocaine trade also experienced significant decreases in crime. Instead, these characteristics point toward country-wide policy changes as being the cause.

Related Literature

Donohue & Levitt (2001) first introduced the idea that the levels of criminality of a given cohort can be traced back to how 'wanted' births in that cohort were. Donohue & Levitt used this relationship to argue that abortion legalization accounted for as much as 50% of the decline in crime rates in the US.

Donohue & Levitt's work was followed by several critiques and applications to other nations. Joyce (2004) and Foote & Goetz (2005) made critiques of their methodology, both of which were addressed by Donohue & Levitt in (2004) and (2008) respectively. Buonanno et al. (2011) and François et al. (2014) investigated the effect of abortion on crime in Europe; Buonanno et al. found no effect while Francois et al. did find an effect.

The literature is still unsettled. Donohue & Levitt (2020) published an updated review of their 2001 study, extending their study to also cover the period from 1998 to 2014 in order to capture the full effect of abortion over time. They concluded that its predictions held up strongly and confirm their previous findings.

Other country-wide factors have also been proposed as explanations for the rise and fall in crime in the late 20th century. Chief among these is the lead-crime hypothesis, first proposed by Nevin (2000) and expanded on by Reyes (2007), which suggests that the increase and decrease in crime rates during the 1960s and 1990s respectively can be attributed to changes in childhood lead exposure, which increased with the introduction of lead in gasoline and decreased following its removal. The most recent meta-analysis of the lead-crime hypothesis by Higney et al. concluded that "the abatement of lead pollution may be responsible for 7–28% of the fall in homicide in the US", leaving "93-72% unaccounted for" that must be explained by other factors (2022, p. 1,15).

While the previous two factors have been investigated extensively, research into the impact of contraceptive access on crime has been lacking. Researchers have looked at how contraception affected other factors. Goldin & Katz (2002) studied how access to the Pill increased women's long-term career investment and pushed back the average age of first marriage. Hock (2007) examined how unconstrained access to the Pill not only increased female college enrollment and completion rates, but also improved the educational attainment of their male partners. Bailey (2013) presented evidence suggesting these effects extended even to their offspring, increasing their children's college completion, labor force participation, wages, and family income. These studies underscore the far-reaching societal impact of coitus-independent contraceptives.

Only Pantano (2007) and Hill et al. (2012) have examined the effect of contraceptive access on crime specifically and of these, only Pantano has focused on the birth control pill. Hill et al. focused solely on the accessibility of contraceptives, indiscriminately equating the effectiveness of all birth control methods. This oversimplified assumption evidently induces inaccuracies and obscures the distinct impact of access to coitus-independent contraception. In his study, Pantano looks only at the effects of the birth control pill on arrest counts, a metric highly susceptible to policy shifts which may potentially overshadow the underlying influence of the Pill.

Causal Mechanisms

Similarly to abortion as investigated by Donohue & Levitt (2001), better, coitus-independent contraception can influence crime via several different pathways.

The simplest way better contraception decreases crime is by reducing cohort sizes, so that when these smaller cohorts reach their high-crime late-adolescent years, there are fewer people to commit crimes. Bailey (2013) found that the increased access to coitus-independent contraception due to *Griswold* alone was responsible for a 4 percent drop in birth rates. Thus, total crime committed by this cohort would be expected to fall by a minimum of 4 percent as well.

Better contraception may also decrease crime by reducing unwanted fertility. Unwanted fertility does not directly produce crime (Pantano, 2007). Rather, it results in cumulative disadvantages which ultimately increase criminal tendencies.

Unwanted and unintended children are likely to receive smaller human capital investments by their parents and are more likely to get in trouble when they get older (Hill et al., 2012). One such reason for this is that unintended children tend to derail parents' education and career plans. If born, unintended children may stall maternal and paternal human capital accumulation by reducing mother's and father's formal education attainment, and by lowering the mother's life-cycle labor force participation (Hock, 2007; Pantano, 2007). This in turn will reduce the amount of human capital available for the parents to invest into their unintended children. Unwanted children are likely to receive inadequate prenatal care, child abuse, and neglect, which will affect them through childhood and early adolescence and increase their risk of crime (Pantano, 2007).

Women use contraception to optimize the timing of childbearing. "A given woman's ability to provide a nurturing environment to a child can fluctuate over time depending on the woman's age, education, and income, as well as the presence of a father in the child's life, whether the pregnancy is wanted, and any drug or alcohol abuse both in utero and after the birth" (Donohue & Levitt, 2001, p. 381). Better contraception provides a woman more certainty to delay childbearing if the current conditions are suboptimal. Thus, even if lifetime fertility for women does not change significantly, their children are born into better environments, and future criminality is likely to be reduced.

Data

Contraception

This study uses data on contraception from The Integrated Fertility Survey Series (IFSS) (Smock et al., 2010), which integrates data from ten component surveys of family and fertility: the Growth of American Families studies of 1955 and 1960; the National Survey of Fertility of 1965 and 1970; and the National Surveys of Family Growth of 1973, 1976, 1982, 1988, 1995, and 2002. The IFSS gathers information on pregnancy and births, marriage and cohabitation, infertility, use of contraception, family life, and general and reproductive health from surveys of American women.

The IFSS reports whether each respondent has ever used or currently uses highly effective, coitus-independent contraceptive methods or less-effective, coitus-dependent methods. Coitus-independent methods reported are as follows: birth control pill, vasectomy, female sterilization, Depo-Provera/Lunelle, Norplant, emergency contraceptive pill, IUD, and patch. Coitus-dependent methods reported are as follows: condom, withdrawal, rhythm by calendar/temperature, diaphragm (with or without jelly/cream/suppository/insert), female condom, foam, jelly/cream/suppository/insert, cervical cap, and Today sponge. For the purposes of this study, these technologies will be evaluated as part of their respective groups. Each contraceptive technology will not be examined individually.

I use the ever-usage data of coitus-independent contraceptives to measure the growth in access and usage of new, more effective coitus-independent contraception instead of current-usage data. The basis of this

decision lies in the presumption that any female who previously used coitus-independent contraception but has discontinued its use, has done so by conscious choice. Given this assumption, the 'current-usage' data may fail to accurately represent access, as it inherently encompasses not only the 'accessibility of coitus-independent contraceptives', but also an unavoidable 'choice factor' that potentially skews the data. Consequently, 'ever-usage' data, in my view, provides a more precise measurement of access.

The IFSS provides post-stratified weights for each respondent to adjust the component surveys to be representative of the United States population at the time of survey, accounting for over-sampling, under-sampling, non-response, and post-stratification adjustment. To ensure my conclusions using the survey data are applicable to the national population, I took these weights into account for all related calculations in the entire paper. To capture the impact of newly created and liberalized coitus-independent methods, I examine data from 1955 to 1976.

Crime

To measure crime, I use state-year data on homicides per 100,000 from the National Vital Statistics System (NV) (National Center for Health Statistics, 2003) for the years 1980-2003. For information on the age characteristics of homicide offenders, I use age data in 1988 from Crime Data Explorer's Expanded Homicide Offense Characteristics (CDE) (Federal Bureau of Investigation, 2022).

Similar studies have also used counts of property crime, violent crime, and arrests as metrics to measure crime. I have restricted my research solely to homicide, as these other categories and metrics of crime are much less reliable and are prone to changes in policy, reporting rates, and policing (Leigh & Wolfers, 2000). For example, the implementation of zero-tolerance policing is likely to result in more arrests, even if the actual number of crimes of each type has not changed. In comparison, homicides are considered to be a good indicator of rates of violent crime, being easy to define and comprehensively measured.

Data Analysis

The IFSS data requires several pre-processing steps before being usable for analysis. SPSS Statistics was used to facilitate data processing and analysis.

The interview dates for each respondent were given in century month codes (CMC). In order to be compatible with state-year NV data, these need to be converted to years via $\text{year} = \text{TRUNC}\left(\frac{\text{CMC}-1}{12}\right) + 1900$, where TRUNC is an operator in SPSS that drops the decimals resulting from the division in order to produce a clean year value.

Since I am examining only the years from 1955 to 1976, I filtered out responses from all other years from the dataset. All data from 1955 is sourced from the 1955 Growth of American Families Survey, which surveyed only 'currently married white women age 18-39'. In later surveys, this was broadened to include unmarried women of all races from 15 to 44. In order to ensure comparable samples for all other years, I filtered out responses from never-married women, nonwhite women, women under 18, and women over 39.

The IFSS does not provide data on respondents' state of residence at time of the survey, but does provide data on respondents' state or region of residence from age 6-16. I assume that their state of residence at age 6-16 is the same as their state of residence at time of survey, as the number of people who migrate across states is relatively minor. In order to be compatible with state-year NV data, all residence data must be in terms of states. Thus, I filtered out all responses that do not provide a state of residence.

The IFSS provides data on the ever-usage status per-respondent of each individual contraceptive technology. I computed a new variable capturing whether each respondent has ever used any coitus-independent contraceptive method. Based on this true/false variable, I calculated the ever-usage rate u via $u = \frac{n_u}{t}$, where n_u

is the number of women in the sample who have ever used coitus-independent contraceptives, and t is the total number of women in the sample. I used this calculation to produce Figure 1 and Appendix A, tracking changes in the ever-usage rate of coitus-independent contraceptives from 1955 to 1976. I round ever-usage rates in Appendix A to the hundredths place to represent a decimal percentage value out of 1.00. Due to the small size of the sample for each state, using any more decimals would give a false impression of the precision of the data.

I used data from Appendix A to compute a new dataset on per-state, per-year ever-usage rates. I removed any states with missing year data and used linear interpolation via Equation 1 to fill in data for years 1956 to 1972 and 1974 to 1975.

Equation 1:

$$y = y_0 + (x - x_0)\frac{y_1 - y_0}{x_1 - x_0}$$

In Equation 1, y is the interpolated ever-usage rate for an unknown year x. x_0, y_0 are the year and ever-usage rate respectively for the first known year before year x, and x_1, y_1 are the year and ever-usage rate respectively for the first known year after year x.

Better contraception does not have an immediate effect on the homicide rate. Rather, the cohorts exposed to better contraception must reach an age at which homicides are committed and replace the previous non-exposed cohorts before an effect appears. In order to calculate the appropriate year delay between the use of coitus-independent contraception and its effect on the homicide rate, I used CDE data on the ages of homicide offenders in 1988 given in Table 1 to calculate the average age of homicide offender via Equation 2.

Table 1. Homicide Offender Ages in 1988

Age Range Number	Age of Homicide Offender	#
	Unknown	6002
1	0 to 9	4
2	10 to 19	2706
3	20 to 29	5577
4	30 to 39	3121
5	40 to 49	1373
6	50 to 59	581
7	60 to 69	303
8	70 to 79	135
9	80 to 89	44
10	90 to Older	7

Equation 2:

$$\frac{\sum_{n=1}^{10} g_{n_\delta} c_n + g_{n_\zeta} c_n}{2\sum_{n=1}^{10} c_n}$$

In Equation 2, g is the age of offender, c is the count of offenders in a given age range, n is the age range number from 1 to 10 as given in Table 1, δ indicates using the left endpoint of the age range, and ζ indicates using the right endpoint of the age range. I calculated an average homicide offender age of 30, which I set as the time delay between the use of better contraception and homicide year in order to capture most of the effect of contraception on the homicide rate. In preparation for a linear regression, I also calculate the average homicide rate per year, finding that homicides peaked in 1991.

Based on these calculations, I constructed a scatterplot of the association between the increase in usage of coitus-independent contraception after 1961 and the decrease in homicide rates after 1991, the year of peak homicides. The resulting plot, produced via SPSS, is shown in Figure 2.

I used this scatterplot to construct a simple linear regression. In a simple linear regression, Equation 3 describes the relationship between the increase in ever-usage rate in any given state in any given year after 1961, and the decrease in homicide rate after 1991 in said state 30 years after said year.

Equation 3:
$$H_{s,y+30} = \beta_r \times U_{s,y} + \alpha_r + \varepsilon_{s,y+30}$$

Equation 4:
$$H_{s,y+30} = h_{s,1991} - h_{s,y+30}$$

Equation 5:
$$U_{s,y} = u_{s,y} - u_{s,1961}$$

In Equation 3, s is some state and y is some year. $H_{s,y+30}$ is the decrease in homicide rates after 1991 in a given state s 30 years after year y, calculated via Equation 4, where $h_{s,y+30}$ is the homicide rate in a given state s 30 years after year y.

$U_{s,y}$ is the increase in ever-usage rate of coitus-independent contraceptives after 1961 in a given state s in year y, calculated via Equation 5, where $u_{s,y}$ is the ever-usage rate in a given state s in year y.

α_r is the y-intercept, while β_r estimates the effect of the ever-usage rate increase on the homicide rate decrease. $\varepsilon_{s,y+30}$ is an error term that captures all other factors and quantifies the offset between any point and the best fit line as defined by α_r and β_r only. In order to find the best-fit line via these equations, we find the estimated values $\hat{a}_r$ and $\hat{\beta}_r$ for α_r and β_r that provide the best fit for all points by minimizing the squared sum of all $\varepsilon_{s,y+30}$. This can be calculated via Equation 6 and Equation 7.

Equation 6:
$$\hat{\alpha}_r = \overline{H} - \left(\hat{\beta}_r \overline{U}\right)$$

Equation 7:
$$\hat{\beta}_r = \frac{\sum_s \sum_{y=1961}^{1976} \left(U_{s,y} - \overline{U}\right)\left(H_{s,y+30} - \overline{H}\right)}{\sum_s \sum_{y=1961}^{1976} \left(U_{s,y} - \overline{U}\right)^2}$$

The results of this analysis, calculated via SPSS, are shown also in Figure 2.

While a linear regression is a simple method to quantify the relationship between 2 variables, it has a significant shortcoming in this scenario. It provides only one α_r value for the entire dataset and fails to account for innate differences between states. For example, certain states like Louisiana always have higher homicide rates than states like Massachusetts due to various persistent historical factors such as statewide poverty as a result of historical discrimination and under-investment (Asher et al., 2021). These differences cannot be accounted for through ever-usage rate alone.

A fixed-effects model accounts for this issue, extending the concept of linear regression by substituting the global y-intercept value for a per-group fixed effects value. I constructed the following fixed-effects model as Equation 8.

Equation 8:
$$h_{s,y+30} = \beta \times u_{s,y} + \alpha_s + \varepsilon_{s,y+30}$$

In Equation 8, α_s controls for state fixed effects, and is unique for each state, thus accounting for the innate differences between states. β estimates the effect of the ever-usage rate u on the homicide rate h 30 years later. All other variables are as defined previously. The results of this analysis via SPSS are shown in Figure 3.
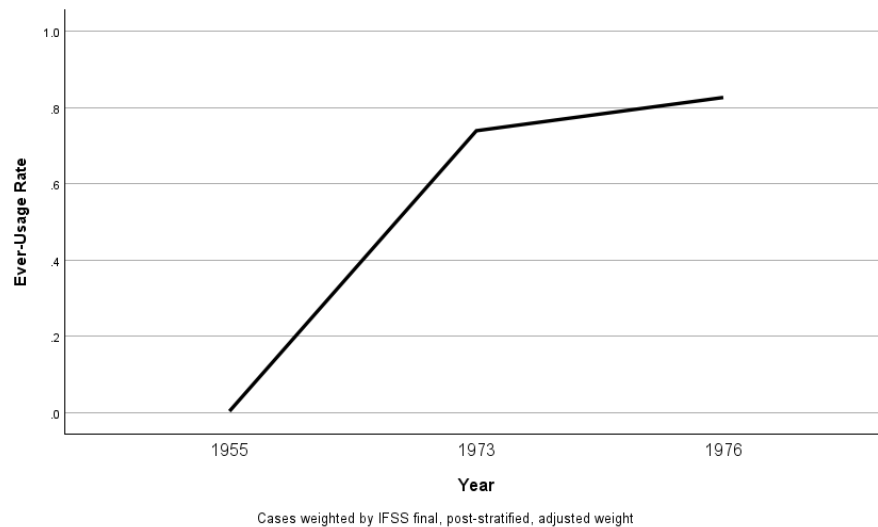
Results

Figure 1. Ever-Usage Rate of Coitus-Independent Contraceptives by White Married Women 18-39

As shown in Figure 1, the ever-usage rate of coitus-independent contraceptives across the entire country climbed dramatically from 1955 to 1973, leveling off after reaching near-full usage. However, the rise in usage in individual states differed based on their dates of contraceptive legalization.
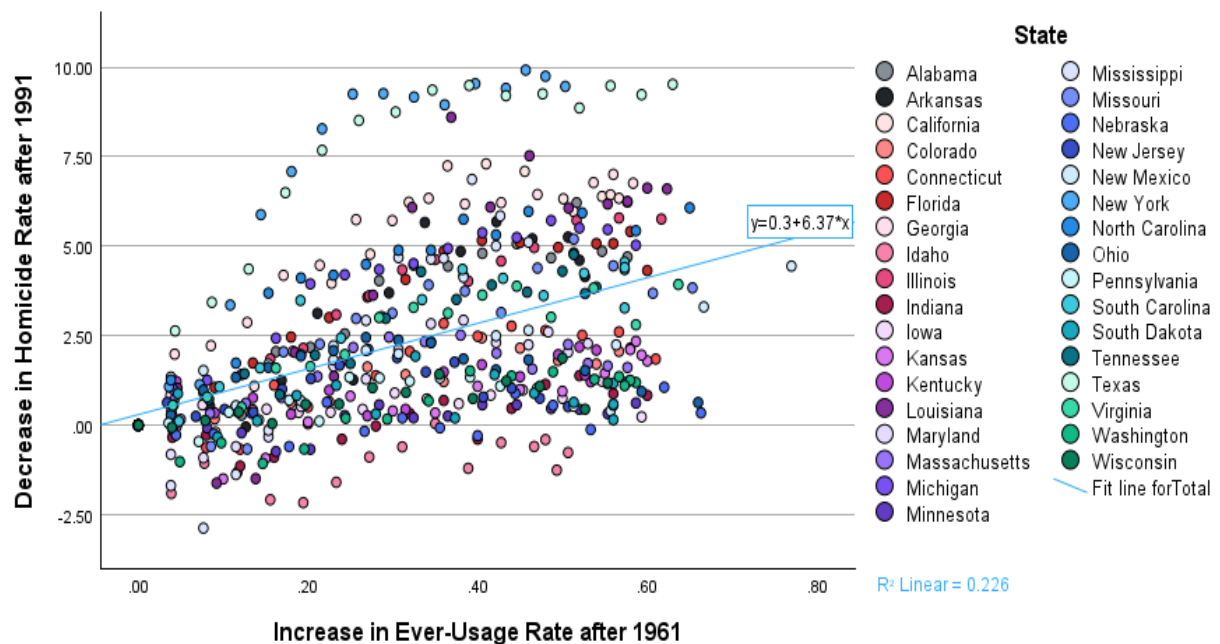

Figure 2. Association Between the Increase in Ever-Usage Rate of Coitus-Independent Contraception after 1961 and the Decrease in Homicide Rates after 1991

Figure 2 shows a weak positive correlation between increases in the ever-usage rate and decreases in the homicide rate. This correlation supports the notion that increases in the ever-usage rate of coitus-independent contraceptives helped decrease homicide rates 30 years later. The computed linear regression line has $R^2 = 0.226$, which indicates a relatively strong correlation in the field of social sciences and economics.

Fixed Effects[a]

Source	F	df1	df2	Sig.
Corrected Model	63.553	1	746	<.001
Ever-Usage Rate of Coitus-Independent Contraceptives	63.553	1	746	<.001

Probability distribution: Normal
Link function: Identity[a]

a. Target: Homicide Rate Per 100,000 30 Years Later

Figure 3. Fixed Effects Model for Homicide Rate

Figure 3 presents the results of the fixed-effects model utilizing this between-state variation to test for the effect of the ever-usage rate of coitus-independent contraceptives on the homicide rate 30 years later. As per the table, a statistically significant effect of the ever-usage rate on the homicide rate is evident ($p < 0.001$), which is significantly lower than the conventional p-value threshold of 0.05. This supports the argument that access to coitus-independent contraception impacted homicide rates 30 years later. The results of the fixed-effects model indicate a stronger correlation than the simple linear regression would suggest, as the fixed-effects model adjusts for innate differences between states.

Evaluation

Evidence presented in this paper supports the argument that increased access to better, coitus-independent contraception reduced crime years later, when cohorts born after liberalized contraception reach their criminal prime. While further analyses are necessary, these findings suggest that the abortion-crime hypothesis may be extended to other policies that also reduce the level of unwanted fertility.

Policymakers should take these effects into account when debating legislation that affects rates of unwanted fertility. Policies on such issues as contraceptive access should be evaluated not only on their societal effects on the present, but also the societal effects they will have on the future. Costs associated with crime, policing, and incarcerating criminals are economically and socially expensive. Low-cost legislation to increase access to better contraception could prevent criminality at its source, avoiding such expenditures on crime. Increasing access to options such as contraception allows women to make better decisions on when to have children, ultimately raising them into more productive citizens.

Limitations and Further Investigation

The analyses and methodologies used in this paper have a number of limitations. Future analyses should consider these limitations to further build on this investigation using alternative approaches that account for said shortcomings.

In this analysis, I examine only the homicide rate 30 years later. While the homicide rate is a good indicator of rates of violent crime, it is only one metric. Future investigations should also include rates of property crime, violent crime, and arrests, adjusting their time delays to the average age of their respective offenders. This will enable a more comprehensive understanding of the impact of coitus-independent contraception across different crime measures.

My analysis looks only at white women, as little data exists on contraception among other races and ethnicities in the United States in the mid-20th century. If such data can be found, future investigations should examine those groups as well.

The between-states fixed-effects model used in this analysis neglects several other elements that might influence homicide rates such as lead exposure, abortion rates, and income growth (Donohue & Levitt, 2001; Hill et al., 2012; Reyes, 2007). These variables may complement or undermine the effect of coitus-independent contraception. Therefore, future research should account for these factors to produce a more complete understanding of the crime decrease in the 1990s.

While the techniques used in this analysis provide stronger evidence than a basic multivariate regression or national time series, it is nonetheless weaker than some other quasi-experimental methodologies due to issues with data on contraceptive access (Bailey, 2013). In order to produce usable data for the fixed-effects model, linear interpolation was used to fill in ever-usage rate data for the years 1956 to 1972 and 1974 to 1975. This technique may have introduced discrepancies into the data. Unfortunately, due to the fluctuating legality of contraception until 1972, very few surveys on contraceptive access exist before said year. Of the data that does exist, almost none of it provides the respondents' state of residence, which my fixed-effects model needs.

Previous researchers such as Goldin & Katz (2002), Hock (2007), and Bailey (2013) have somewhat compensated for this issue by exploiting more specific historical policy variation, utilizing state-level restrictions on contraceptive access for unmarried women ages 18 to 21. For this group, various laws in different states limited their access to contraception until the mid-1970s. By looking at whether state-year cohorts of these women did or did not have access to contraception, said researchers have discovered the wide-ranging effects of contraceptive access. Future analyses should deploy a similar strategy to look at the effect of contraception on crime with greater certainty.

References

Asbell, B. (1995). *The Pill: A Biography of the Drug That Changed the World* (Updated edition). Random House.

Asher, J., Horwitz, B., & Monkovic, T. (2021, February 15). Why Does Louisiana Consistently Lead the Nation in Murders? *The New York Times*. https://www.nytimes.com/2021/02/15/upshot/why-does-louisiana-consistently-lead-the-nation-in-murders.html

Bailey, M. J. (2013). *Fifty Years of Family Planning: New Evidence on the Long-Run Effects of Increasing Access to Contraception* (Working Paper 19493). National Bureau of Economic Research. https://doi.org/10.3386/w19493

Buonanno, P., Drago, F., Galbiati, R., & Zanella, G. (2011). Crime in Europe and the United States: Dissecting the 'reversal of misfortunes.' *Economic Policy*, *26*(67), 347–385. https://doi.org/10.1111/j.1468-0327.2011.00267.x

DiIulio, J. J. (1996). Help Wanted: Economists, Crime and Public Policy. *Journal of Economic Perspectives*, *10*(1), 3–24. https://doi.org/10.1257/jep.10.1.3

Dobbs v. Jackson Women's Health Organization, 597 Rebecca A. Womeldorf 215 (U.S. Supreme Court 2022). https://www.supremecourt.gov/opinions/21pdf/597us1r58_gebh.pdf

Donohue, J. J., III, & Levitt, S. D. (2001). The Impact of Legalized Abortion on Crime. *The Quarterly Journal of Economics*, *116*(2), 379–420. https://doi.org/10.1162/00335530151144050

Donohue, J. J., III, & Levitt, S. D. (2008). Measurement Error, Legalized Abortion, and the Decline in Crime: A Response to Foote and Goetz. *The Quarterly Journal of Economics*, *123*(1), 425–440. https://doi.org/10.1162/qjec.2008.123.1.425

Donohue, J. J., & Levitt, S. (2020). The Impact of Legalized Abortion on Crime over the Last Two Decades. *American Law and Economics Review*, *22*(2), 241–302. https://doi.org/10.1093/aler/ahaa008

Donohue, J. J., & Levitt, S. D. (2004). Further Evidence That Legalized Abortion Lowered Crime: A Reply to Joyce. *The Journal of Human Resources*, *39*(1), 29–49. https://doi.org/10.2307/3559004

Federal Bureau of Investigation. (2010). *Crime in the United States by Volume and Rate per 100,000 Inhabitants, 1991–2010*. Crime in the United States 2010. https://ucr.fbi.gov/crime-in-the-u.s/2010/crime-in-the-u.s.-2010/tables/10tbl01.xls

Federal Bureau of Investigation. (2022). *Expanded Homicide Offense Characteristics in the United States*. Crime Data Explorer. https://cde.ucr.cjis.gov/LATEST/webapp/#/pages/explorer/crime/shr

Foote, C. L., & Goetz, C. F. (2005). *Testing Economic Hypotheses with State-Level Data: A Comment on Donohue and Levitt* (SSRN Scholarly Paper 866864). https://doi.org/10.2139/ssrn.866864

François, A., Magni-Berton, R., & Weill, L. (2014). Abortion and crime: Cross-country evidence from Europe. *International Review of Law and Economics*, *40*, 24–35. https://doi.org/10.1016/j.irle.2014.08.001

Goldin, C., & Katz, L. F. (2002). The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions. *Journal of Political Economy*, *110*(4), 730–770. https://doi.org/10.1086/340778

Higney, A., Hanley, N., & Moro, M. (2022). The lead-crime hypothesis: A meta-analysis. *Regional Science and Urban Economics*, *97*, 103826. https://doi.org/10.1016/j.regsciurbeco.2022.103826

Hill, N. J., Siwatu, M., & Granger, M. (2012). Safe Sex, Safe Communities: Analyzing the Link Between Contraceptive Usage and Crime Rates. *Journal of the Southwestern Society of Economists*, *39*, 89–106. https://swer.wtamu.edu/sites/default/files/Data/89-106-280-1044-1-PB.pdf

Hock, H. (2007). *The Pill and the College Attainment of American Women and Men* (Working Paper wp2007_10_01). Department of Economics, Florida State University. https://econpapers.repec.org/paper/fsuwpaper/wp2007_5f10_5f01.htm

Institute of Medicine (US) Committee on Unintended Pregnancy. (1995). Patterns of Contraceptive Use. In S. S. Brown & L. Eisenberg (Eds.), *The Best Intentions: Unintended Pregnancy and the Well-Being of Children and Families*. National Academies Press (US). https://www.ncbi.nlm.nih.gov/books/NBK232135/

Joyce, T. (2004). Did Legalized Abortion Lower Crime? *Journal of Human Resources*, *XXXIX*(1), 1–28. https://doi.org/10.3368/jhr.XXXIX.1.1

Knowles, J. (2012). *A History of Birth Control Methods*. Planned Parenthood Federation of America.

Leigh, A., & Wolfers, J. (2000). Abortion and Crime. *AQ: Australian Quarterly*, *72*(4), 28–40. https://doi.org/10.2307/20637935

National Center for Health Statistics. (2003). *All Ages Deaths from Compressed Mortality* [dataset]. CDC WONDER On-line Database. https://wonder.cdc.gov/mortSQL.html

Nevin, R. (2000). How Lead Exposure Relates to Temporal Changes in IQ, Violent Crime, and Unwed Pregnancy. *Environmental Research*, *83*(1), 1–22. https://doi.org/10.1006/enrs.1999.4045

Pantano, J. (2007). *Unwanted Fertility, Contraceptive Technology and Crime: Exploiting a Natural Experiment in Access to The Pill*. https://escholarship.org/uc/item/8rw2m36w

Reyes, J. W. (2007). *Environmental Policy as Social Policy? The Impact of Childhood Lead Exposure on Crime* (Working Paper 13097). National Bureau of Economic Research. https://doi.org/10.3386/w13097

Smock, P., Granda, P., & Hoelter, L. (2010). *Integrated Fertility Survey Series, Release 7, 1955-2002 [United States]: Version 7* (Version v7) [dataset]. ICPSR - Interuniversity Consortium for Political and Social Research. https://doi.org/10.3886/ICPSR26344.V7

Stolberg, S. G. (2023, June 17). A Year After Dobbs, Advocates Push in the States for a Right to Birth Control. *The New York Times*. https://www.nytimes.com/2023/06/17/us/politics/birth-control-dobbs-clarence-thomas.html