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Abortion and Property Crime: What becomes of the Mothers?

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Abstract

Using yearly data from 1973-2009, we estimate an error correction model to examine the effects of abortion rates on property crime rates among the U.S. female population aged 15-44. Controlling for income per capita, the female unemployment rate, and the female incarceration rate, the findings suggest that a 1% increase in the abortion rate is associated with a 0.43% increase in the property crime rate, or a 1% decrease in the abortion rate is associated with a 0.43% decrease in the property crime rate. We suspect this result indicates that a woman with fewer or no children is relatively more risk averse than a woman with many children. Given that property crime appears to be an external cost associated with abortion, our results suggest that in years when abortion rates are rising or are higher than average, it is prudent to devote additional resources to combating property crime, especially if the relationship we found persists.

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1. Introduction

Donohue and Levitt (2001) famously show that the legalization of abortion played a significant role in the drop in total national crime in the 1990s. Citing various sociological theories, Levitt posited that a mother contemplating abortion does so if she is not economically and psychologically able to raise a child. A child born into this situation would more likely feel neglected and may be more likely to resort to crime at a later age. Not only did Levitt's seminal research garner popular media attention (e.g., *Freakonomics*), it has generated a host of additional academic research across multiple disciplines, some of which has corroborated his original findings while others have refuted said findings.

While the focus of Levitt is the potential criminality of individuals whose pregnancies were terminated, the focus of the present paper is instead on the mothers and for a few reasons. First, barring the death of the mother during pregnancy or during the abortion procedure, a mother who terminates a pregnancy is alive and therefore faces the possibility of social, economic, and psychological stress which could trigger a criminal response. Second, the fact that the mother is alive makes it logically possible for her to have the option to commit a crime, which is not true for an individual whose pregnancy was terminated – what an unborn individual might have done is considerably more speculative than what an alive person can do. Finally, we focus on mothers because there appears to be little focus on the effect of abortion rates on property crimes committed by females. We thus ask the following question, do abortion rates affect the number of property crimes committed by females? We find evidence supporting a positive relationship, with a focus on property crimes since they account for 70% of women in prison and from 1980-2011 twice as many women were arrested for property crimes than violent crimes (Campaniello, 2014).

To further explore the relationship between abortion and property crimes among females in the US, the remainder of the paper is organized as follows. First we present a literature review of the relationship between unemployment and crime, followed by sociological review of the criminal gender gap. The next section presents the data and estimation method and results. The final section offers a brief discussion of the results and concluding remarks.

2. Literature Review

2.1 Unemployment and Crime

A major focus on empirical papers on the determinants of crime focus on the relationship between unemployment and crime (U-C). The U-C relationship can be separated into a criminal motivation factor and criminal opportunity factor (Frederick, Jozefowicz, and Nelson, 2015). In the short run, the criminal opportunity factor suggests a negative U-C relationship, as unemployed individuals will spend more time at home guarding belongings. In the long run if unemployment persists, unemployed individuals may resort to committing various crimes (Bandyopadhy, Bhattacharya, and Sensarma, 2015) (criminal motivation factor). Some papers find evidence of the criminal motivation factor (Cantor & Land, 1985; Melick, 2004), while others find evidence of criminal opportunity (Raphael & Ebmer, 2001; Edmark, 2005).

Income and income inequality are other macroeconomic variables typically included in crime studies (Machin & Meguir, 2000; Gould et al. 2002). A negative relationship between income and crime is expected because a rise in income raises the opportunity cost of committing crime (Fleischer, 1966). However, many of the existing results are mixed. Dritsakis and Ghanas

(2009) find crime and income have a positive relationship in Greece. Beki et al. (1999) find a negative relationship between income and burglary, but a positive relationship between income and car theft. Similar to income, there is no general consensus on the role of income inequality on crime rates (Fajnzylber et al. 2002; Neumayer, 2003).

Becker (1974) describes committing crime as a rational decision with the offender weighing marginal benefits and costs of crime. Raising the marginal cost of crime includes increases in the probability of arrest and/or conviction. As such, an increase in the number of police (Di Tella, R. & Schargrodsky, 2004; Chalfin and J. McCrary, 2012), and prison populations (Levitt, 1996) have been investigated. Di Tella and Scargrodsky (2004) find a large local crime deterrent effect when police are visible in Buenos Aires. Chalfin and McCrary (2012) find $1 spent on extra police reduce victimization costs by $1.60 across a panel of US cities. Levitt (1996) finds a 1 prisoner reduction leads to an increase of 15 crimes per year.

Controlling for income, unemployment, handgun laws, and per capita beer consumption among other variables, Donohue and Levitt (2001) show legalized abortion contributed to a fall in US crime rates in the mid-1990s. With *Roe v. Wade*, pregnancies of "unwanted" children could be legally terminated. The authors argue an "unwanted" child is more likely to be a criminal in the teens and twenties than a "wanted" child. Of course legally aborted "unwanted" children in the early 1970s never had a chance to be criminals in the 1990s. Although this paper has been criticized empirically (Lott and Whitley, 2007; Joyce, 2009; Foote and Goetz, 2008), the paper poses an interesting idea that has been replicated several times. Leigh and Wolfers (2000) find legalized abortion decreases crime rates in Australia, as does Francois et al. (2014) for a panel of European countries. Kahane et al. (2007) do not find a relationship between abortion and crime for England and Wales.

2.2 The Gender Gap in Crime

Several theories in sociology and criminology attempt to explain the gender gap in crime. One strand of research indicates that men are more prone than women to commit crimes, especially violent crimes (Denno, 1994), yet notes that the criminal gap between males and females is shrinking (Campaniello, 2014).Cesare Lombroso, the father of criminology, finds biological abnormalities studying the skulls of criminals of both genders, hence argues that some individuals are "born criminals" (Lombroso, 1895). Sutherland (1939) takes a different view explaining crime is learned behavior (differential association theory). Schwartz and Steffensmeier (2007) discuss other theories including control theory and anomie theory. Control theory suggests females, from a young age, are more strictly monitored than boys, providing less opportunity for deviant behavior (Schwartz and Steffensmeier, 2007; Giodano, Cernkovich, and Pugh, 1986). Merton's anomie theory (1957), or strain theory, suggests individuals are driven to crime when they are under pressure by not meeting their economic goals. Agnew (1992) and Broidy and Agnew (1997) develop the general strain theory and discuss the difference in emotional responses between men and women to situations as being a driver of crime.

Despite the extensive gender crime gap literature that exists in criminology, considerably less attention is devoted to studying crimes committed by females in economics. Understanding female criminal behavior is important, however, due to its negative effect on the family structure (Ilchenko, 2014). Jianakoplous and Bernasek (1998) show that single women become relatively more risk adverse as the number of individuals under the age of 18 living in the same household increases. In describing gender differences in crime, Schwartz and Steffensmeier (2007) note that child-rearing places constraints on female deviant behavior. Given these discussions, we

hypothesize that an increase in abortion rates increases female property crime rates as women would become more risk averse.

3. Data

We use annual national (US) data from 1973 to 2009. Property crime rates, $crime_t$, are calculated as the number of burglaries and acts of larceny committed by females divided by the US female population aged 15-49. Total number of property crimes which come from the FBI Uniform Crime Reports (UCR), can be subject to a variety of data measurement problems such as underreporting and hierarchical crime accounting (Becsi, 1999; DiIulio, 1996). The UCR reports data on eight different crimes, including four violent crimes and four property crimes. Burglary and larceny both involve the unlawful taking of another's property. Larceny, however, does not involve unlawful entry and includes crimes such as pickpocketing.

Crimes are published at the state level and are only available in text form. Crime data had to be manually inputted before yearly aggregation. Some state level data was missing. In order to fill in the gaps, data for the missing year was interpolated using an average of the crime rates from the years immediately preceding and following the missing year. If data was missing for a particular state for two or more consecutive years, particularly in the case of Kansas and Washington D.C., the missing data was forecasted using a simple linear extrapolation. Data for 2002 was not available and therefore had to be estimated averaging the national averages for 2001 and 2003. Other than 2002, the data is mostly complete.[1]

Abortion rates, $abort_t$, are measured as the number of abortions per 1000 live births and come from the Center for Disease Control (CDC). Abortion data before 1973 (Roe v. Wade) exists however the CDC mentions data during this time data may be inaccurate since it was illegal therefore our data begins in 1973.

Real GDP per capita, gdp_t, comes from the World Bank (2017) and the female unemployment rate, $unemp_t$, comes from the St. Louis Federal Reserve (FRED, 2017). The effect of such macroeconomic variables on crime is inconclusive (Frederick, Jozefowicz, and Nelson; 2016). While unemployment may motivate potential offenders to commit crime (Bandyopadhy et. al, 2015; Phillips and Land, 2012), the list of potential victims may decrease as more unemployment may mean more people stay home (Frederick, Jozefowicz, and Nelson; 2016). FRED does not report the female unemployment rate for ages 15-49, but does report the unemployment rate for females aged 16 and over, which was used in this paper.

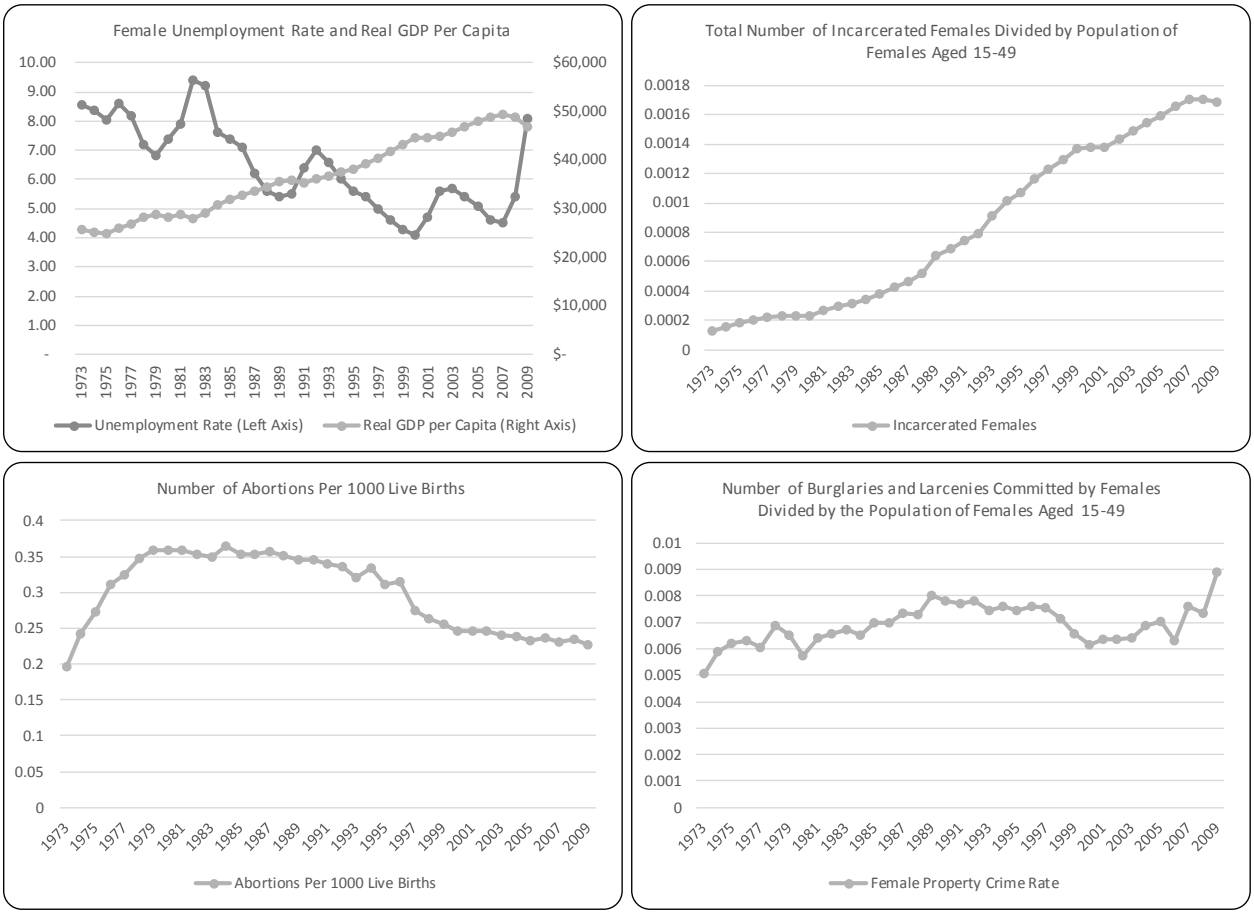
The female incarceration rate, $jail_t$, comes from the site Wikimedia Commons (2017) that collects incarceration statistics from various sources including the US Department of Justice. The inclusion of this variable in the study is motivated by the seminal work of Becker (1974) who describes committing crime as a rational decision. The offender weighs marginal benefits and costs that include the probability of arrest and conviction, which would be imbedded in the incarceration rate. The female incarceration rate is calculated as the total number of incarcerated females divided by the population of women aged 15-49 thereby assuming that this subset of the

[1] Of the 37 years included in the data, there were no missing state level observations for 10 years, 1 missing state level observation for 9 years of data, 2 missing state level observations for 9 years of data, 3 missing state level observations for 3 years of data, 4 missing state level observations for3 years of data, 5 missing state level observations 2 years of data, and 13 missing state level observations for 1 year of data. Aside from 2002, most state level data was available for most years and expected to have little effect on the national statistics.

female population represents the group of potential female criminals. We divided by the population of women aged 15-49 so all variables are scaled similarly.

The figure below displays the time series plots of the included variables, relative to 1973, from 1973-2009. In addition, data was also collected on female education level and female labor force participation rate but were excluded from the estimation due to high correlation with GDP per capita.

Figure 1 – Time Series Plots of Each Variable Relative from 1973-2009



As seen in the top left panel, real GDP per capita increased by over 83% from 1973 to 2009. During the same time period, the female unemployment rate ranges from a low of 4.1% in 2000 to a high of 9.4% in 2009. From 1973 to 2009, the total number of incarcerated females divided by the population of females aged 15-49 grew by 1183%. The number of abortions per 1000 live births increased by 15.8% with a peak of 0.364 in 1984. Lastly, the female property crime rate increased by over 75% from 1973-2009.

4. Estimation Method and Results

The general form of the model in this paper is:

$$crime_t = a_0 + a_1 abort_t + a_2 gdp_t + a_3 jail_t + a_4 unemp_t + e_t, \quad (1)$$

where the variables included in equation (1) are defined in the *Data* section above. The a's are estimable coefficients, e_t an identical and independently distributed (iid) error term, and t represents the time subscripts. All variables are converted to natural logarithms.

Table 2 reports results from (1) although given the time series nature of the data, results from (1) may be spurious. That is, variables may trend together although there may be no meaningful underlying economic relationship between the two variables. Standard errors would be understated, and coefficient significance overstated. To produce reliable estimates, time series data must be stationary, i.e. converge to a dynamic, long run equilibrium (Enders, 2004). While time series variables are typically not stationary in levels, they can be differenced. To test for stationarity, Dickey and Fuller (1979) propose the Dickey Fuller Test and the Augmented Dickey Fuller Test. The Dickey Fuller Test follows:

$$\Delta y_t = \varphi_0 + \varphi_1 y_{t-1} + \varepsilon_{t-1}^{DF}, \quad (2)$$

with the null hypothesis $\varphi_0 = \varphi_1 = 0$. One may run the Dickey Fuller Test with a constant, without, or add a time trend. The Augmented Dickey Fuller (ADF) Test that includes a time trend t, lags of the variable y_t in levels and differences, and takes the form:

$$\Delta y_t = b_0 + b_1 y_{t-1} + b_2 \Delta y_{t-1} + b_3 t + \varepsilon_{t-1}^{ADF}, \quad (3)$$

with the null hypothesis $b_0 = b_1 = b_2 = b_3 = 0$ implying variables are difference stationary. Extra lags may be included.

In addition, we test for white noise of the residuals in (3). A white noise residual has zero mean, zero covariance, and non-constant variance. A white noise residual is further evidence of a stationary process, i.e. a variable converges to its dynamic long run equilibrium over time. The Durbin-Watson (DW) statistic tests zero covariance. Critical DW stats are between 1.37 and 2.63[2], implying no residual correlation if DW lies between the critical statistics. The autoregressive conditional heteroskedastic ARCH(1) test, tests for non-constant variance (heteroskedasticity) in the residual. Failure to reject the null implies the series has constant variance.

Results from Table 1, in general, show variables that are difference stationary with white noise residuals. The t-statistic on $jail_t$ is positive when it should be negative. However, the coefficient is statistically insignificant as it should be and appears to have a white noise residual via the ARCH test and DW test. $abort_t$ is difference stationary but may exhibit non-constant variance by the ARCH test. The DW test statistic for $unemp_t$ is between the lower (1.141) and upper bound (1.370) therefore we cannot accept nor can we reject the null of no autocorrelation. In various pretests of our model, the exclusion of unemployment have no effect on the statistical significance of the other variables therefore we include it in our model. We proceed with estimation of a single equation error correction model because results from the ECM indicate variables are cointegrated. Cointegrated variables converge to a long run dynamic equilibrium.

[2] For k=2, n=35 where k is number of regressors and n is number of observations.

Table 1 - Stationarity Tests

Variable (in first differences)	t-statistic	DW	ARCH
$crime_t$ +no constant DF Test	-1.31	1.68	1.09
$abort_t$ + no constant DF Test	-0.67	2.56	2.51
gdp_t + constant DF Test	-0.94	1.77	-0.22
$unemp_t$ DF Test	-1.62	1.18	0.83
$jail_t$+ trend DF Test	0.41	1.95	0.93

If variables are difference stationary, the error correction model (ECM) can be used to produce reliable coefficient estimates. The ECM takes the form:

$$\Delta crime_t = \gamma_0 + \gamma_1 \Delta abort_t + \gamma_2 \Delta gdp_t + \gamma_3 \Delta jail_{t-1} + \gamma_4 \Delta unemp_t + \gamma_5 e_{t-1} + u_t, \quad (4)$$

where all variables are in first differences and e_{t-1} is the lag of the residual from (1). A statistically significant, negative γ_5 implies variables are cointegrated (Enders, 2004). Results from Table 2 indicate variables are cointegrated. Further evidence of cointegration includes results for the Engle Granger Test which is also included in Table 2. The residual from equation (1) is regressed on its own lag (with no constant). A statistically significant coefficient on the lag of the residual indicates a cointegrated series.

The short run or transitory effect of the independent variables on property crime rates is composed of short run or transitory effects (γ_i, i=1,…, 4) and long run effects (a_i, i=1,…, 4). The long run effects include the negative of the coefficient on the lag of residual in (4) and the coefficients from (1) in the form $-\gamma_5 a_i$. Total effects include both short and long run effects, or $\gamma_i + (-\gamma_5 a_i)$. Standard errors for long run effects are derived with error propagation.

The following table includes the spurious results from (1) and ECM results from (4).

Table 2 - Results from (1) and (4)

Variable	Results from (1) Adj R^2 = 0.57	Results from ECM (4) Adj R^2 = 0.19
$abort_t$	0.31*** (0.09)	
gdp_t	-0.22 (0.35)	
$jail_t$	0.20** (0.08)	
$unemp_t$	0.18* (0.09)	
$\Delta abort_t$		0.26 (0.20)
Δgdp_t		-0.34 (0.82)

$\Delta jail_t$		0.35 (0.23)
$\Delta unemp_t$		0.18 (0.15)
e_{t-1}		-0.52*** (0.18)
Engle Granger Test	-0.50*** (0.16)	

*** 1%, ** 5%, * 10%

Abortion rates are statistically significant in model (1) and have a positive effect on crime rates. Table 3 presents the derived total effects of the independent variables on property crime rates. Standard errors for long run derived coefficients and total effects are approximated using error propagation.

Table 3 - Derived ECM Results

Variable	Total Effect (Short Run + Long Run)
$abort_t$	0.43* (0.22)
gdp_t	-0.45 (1.84)
$jail_t$	0.46* (0.24)
$unemp_t$	0.28* (0.16)

*** 1%, ** 5%, * 10%

5. Discussion of Results and Conclusion

Based on Table 3, we find that a 1% increase in the female incarceration rate increases the female crime rate by 0.46%, which implies that prison may not be an effective deterrent. There are several possible reasons for this result. Incarcerated females may learn to become better criminals, increasing the female property crime rate and the probability of recidivism. It is also worth noting that the female incarceration rate includes all female crimes and not just property crimes, so this variable could be overstated. Finally, the female incarceration rate could be endogenous. That is, the female incarceration rate may impact female property crime rates or vice versa. In an effort to account for this form of endogeneity, we lagged the female incarceration rate in preliminary regressions but find no substantive difference in the result.

Importantly, a 1% increase in the unemployment rate increases the female property crime rate by 0.28%. This result supports the criminal motivation factor, whereby long run unemployment provides motivation to commit crime.

Our most important finding sheds light on the relationship between abortion and property crimes committed by females. Controlling for income per capita, the female unemployment rate, and the female incarceration rate, a 1% increase in the abortion rate is

associated with a 0.43% increase in the property crime rate, or a 1% decrease in the abortion rate is associated with a 0.43% decrease in the property crime rate. We suspect this result indicates that a woman with fewer or no children is relatively more risk averse than a woman with many children. There is no relationship between GDP per capita on female property crime rates.

Given that property crimes committed by females appears to be an external cost associated with abortion, our results suggest that in years when abortion rates are rising or are higher than average, it is prudent to devote additional resources to combating property crime, especially if the relationship we found persists. We are not suggesting that additional resources be devoted to abortion policy (or lack thereof), but rather defer this discussion to the broader social and political landscape for future debate. Instead, we note that if abortions are positively associated with property crimes among females, that this relationship deserves attention given the internal and external costs associated with committing property crimes.

In conclusion, future research can examine the effect of abortion on violent and total crimes committed by females. Additional control variables are important considerations as well, such as family size as it could be a proxy for the level of support (or lack thereof) a mother considering abortion might receive. Other important controls include confounding national level factors that might be contributing to increased property crimes but are not accounted for in our data, such as increased drug use and the idea that drug users might commit property crimes to finance their drug habit. Nonetheless, this is an important topic that deserves additional research given its social and political sensitivity.

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